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STAR Q Swab AS User Manual

Version 1

REF 9002652

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Sample to Insight

QIAGEN

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1 Introduction

Thank you for choosing the STAR Q Swab AS instrument. We are confident it will become an integral part of your laboratory.

Before using the STAR Q Swab AS instrument, it is essential that you read this user manual carefully and pay particular attention to the safety information. The instructions and safety information in the user manual must be followed to ensure safe operation of the instrument and to maintain the instrument in a safe condition.

1.1 About this user manual

This user manual provides information about the STAR Q Swab AS instrument in the following sections:

1. Introduction
2. Safety Information
3. General Description
4. Sample Processing Using STAR Q Swab AS Kits
5. Troubleshooting
6. Maintenance
7. Glossary

The appendices include the following:

- Ordering Information
- Technical Specifications
- Instrument Dimensions
- Chemical Compatibility
- Verification
- Legal information
- Regulatory information
- Safety information in French (FR)
- Safety information in German (DE)

1.2 General information

1.2.1 Technical assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Services department is staffed by experienced scientists with extensive practical and theoretical expertise in sample and assay technologies and the use of QIAGEN products. If you have any questions or experience any difficulties regarding STAR Q Swab AS or QIAGEN products in general, do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information, please see our Technical Support Center at **www.qiagen.com/goto/TechSupportCenter** or call one of the QIAGEN Technical Service Departments or local distributors (see back cover or visit **www.qiagen.com**).

1.2.2 Policy statement

It is the policy of QIAGEN to improve products as new techniques and components become available. QIAGEN reserves the right to change specifications at any time.

In an effort to produce useful and appropriate documentation, we appreciate your comments on this user manual. Please contact QIAGEN Technical Services.

1.2.3 Version management

This document is the *STAR Q Swab AS User Manual*, version 1.

1.3 Intended use of STAR Q Swab AS

The STAR Q Swab AS instrument is designed to perform automated DNA extraction and short tandem repeat (STR) PCR setup in molecular biology applications.

The STAR Q Swab AS is intended to be used only in combination with QIAGEN Investigator® GO! kits listed in Appendix A for sample preparation and STR setup for applications described in the respective QIAGEN kit handbooks.

If the STAR Q Swab AS instrument is used with other than QIAGEN kits, it is the user's responsibility to validate the performance of such product combination for any particular application.

The STAR Q Swab AS instrument is intended for use by professional users, such as technicians and physicians trained in molecular biological techniques and the operation of the STAR Q Swab AS instrument.

1.4 Requirements for STAR Q Swab AS users

This table covers the general level of competence and training necessary for transportation, installation, use, maintenance and servicing of the STAR Q Swab AS instrument.

Task	Personnel	Training and experience
Delivery	No special requirements	No special requirements
Installation	QIAGEN service personnel or service technicians of an authorized agent	Trained and authorized by QIAGEN
Routine use	Laboratory technicians or equivalent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Preventive maintenance	QIAGEN service personnel or service technicians of an authorized agent	Appropriately trained and experienced personnel familiar with use of computers and automation in general
Servicing	QIAGEN service personnel or service technicians of an authorized agent	Trained and authorized by QIAGEN

2 Safety Information

Before using STAR Q Swab AS, it is essential that you read this user manual carefully and pay particular attention to the safety information. The instructions and safety information in the user manual must be followed to ensure safe operation of STAR Q Swab AS and to maintain the instrument in a safe condition.

Note: Translations of the Safety Information in French and German are available in Appendix J — Safety Information (French, FR) and Appendix K — Safety Information (German, DE).

The following types of safety information appear throughout this user manual.

WARNING

The term WARNING is used to inform you about situations that could result in **personal injury** to you or others.

Details about these circumstances are provided to avoid personal injury to you or other persons.

CAUTION

The term CAUTION is used to inform you about situations that could result in **damage to the instrument** or other equipment.

Details about these circumstances are provided to avoid damage to the instrument or other equipment.

The advice given in this manual is intended to supplement, not supersede, the normal safety requirements prevailing in the user's country.

2.1 Proper use

CAUTION

Loss of data

Do not open the front cover during a run. An aborted run, that is one stopped by opening the front cover, cannot be recovered. To open the window during a run, click **Pause** in the run screen, wait until the instrument stops and then open the window.

CAUTION

Loss of data and damage to the instrument

Use only labware defined in this manual with the STAR Q Swab AS instrument. Failure to do so may result in damage to the instrument and incorrect results.

WARNING/ CAUTION

Risk of personal injury and material damage

Improper use of STAR Q Swab AS may cause personal injuries or damage to the instrument. STAR Q Swab AS must only be operated by appropriately trained and experienced personnel.

Servicing of STAR Q Swab AS must only be performed by QIAGEN Field Service Specialists or service technicians of an authorized agent.

CAUTION

Damage to the instrument

Direct sunlight may bleach parts of the instrument and cause damage to parts.

STAR Q Swab AS must be located out of direct sunlight, away from heat sources and away from sources of vibration and electrical interference.

CAUTION

Damage to the instrument

Avoid spilling water or chemicals onto STAR Q Swab AS. Damage caused by water or chemical spillage will void your warranty.

WARNING/ CAUTION

Risk of personal injury and material damage

Do not attempt to move STAR Q Swab AS during operation.

Never lift a fully installed instrument for transportation from one location to another. It must be reinstalled in the new location by an authorized service engineer.

WARNING/ CAUTION

Risk of personal injury and material damage

STAR Q Swab AS weighs approximately 135 kg (297 lbs). Necessary safety precautions should be taken when transporting the instrument.

WARNING/ CAUTION

Explosive atmosphere

STAR Q Swab AS is not designed for use in an explosive atmosphere.

WARNING

Risk of explosion

STAR Q Swab AS is intended for use with reagents supplied with QIAGEN kits. Use of other reagents and substances may lead to fire or explosion.

In case of emergency, switch off STAR Q Swab AS at the power switch and unplug the power supply from the power outlet.

The instrument should be positioned in the laboratory in a way permitting personnel to access the front and sides of the instrument in order to operate, maintain, open and close the protective covers. Consider the dimensions of the instrument (see "Appendix B — Technical Specifications," page 78) and calculate sufficient room for a person to move and work comfortably.

2.2 Electrical safety

Note: Disconnect the line power outlet before servicing.

WARNING

Electrical hazard

Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument dangerous.

Intentional interruption is prohibited.

Lethal voltages inside the instrument

When the instrument is connected to line power, terminals may be live.

Opening covers or removing parts is likely to expose live parts.

Avoid spilling liquid onto or into the instrument. In case of spilling liquid over the instrument, immediately disconnect the instrument from the mains power.

To ensure satisfactory and safe operation of STAR Q Swab AS, follow the guidelines below:

- The line power cord must be connected to a line power outlet that has a protective conductor (earth/ground).
- Keep mains plug easily accessible in case the equipment needs to be disconnected quickly from mains power.
- Use only power supplies and cords supplied with the system.
- If the instrument becomes electrically unsafe, prevent other personnel from operating it and contact QIAGEN Technical Services. The instrument may be electrically unsafe when:
    - The line power cord appears to be damaged.
    - It has been stored for a prolonged period of time in conditions which are outside of the storage conditions outlined in "Appendix B — Technical Specifications," page 78.
    - It has been subjected to severe transport stresses.
    - Liquid has entered the instrument.

2.3 Biological and chemical safety

When handling biological material, use safe laboratory procedures as outlined in publications such as Biosafety in Microbiological and Biomedical Laboratories, HHS (**http://www.cdc.gov/biosafety/publications/bmbl5/index.htm**).

WARNING **Biological materials**

Handle biological material with the greatest of care and in accordance with the required safety regulations. Always wear safety glasses, 2 pairs of gloves and a lab coat.

The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the instrument operators are not exposed to hazardous levels of infectious agents as defined in the applicable Safety Data Sheets (SDSs) or OSHA,* ACGIH† or COSHH‡ documents.

For more information, visit **www.qiagen.com/safety**.

Venting for fumes and disposal of wastes must be in accordance with all national, state and local health and safety regulations and laws.

WARNING **Hazardous chemicals**

Always wear safety glasses, gloves and a lab coat.

The responsible body (e.g., laboratory manager) must take the necessary precautions to ensure that the surrounding workplace is safe and that the operators are not exposed to hazardous levels of toxic substances (chemical or biological) as defined in the applicable Safety Data Sheets (SDSs) or OSHA,* ACGIH† or COSHH‡ documents.

For more information, visit **www.qiagen.com/safety**.

Venting for fumes and disposal of wastes must be in accordance with all national, state and local health and safety regulations and laws.

2.4 Mechanical hazards

WARNING **Moving parts**

To avoid contact with moving parts during operation of STAR Q Swab AS , the instrument must be operated with the cover closed.

Do not remove the cover panels since there are no user-serviceable parts inside. If there is a problem with STAR Q Swab AS, contact QIAGEN Technical Services immediately.

WARNING **Risk of personal injury**

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.

* OSHA: Occupational Safety and Health Administration (United States of America).
† ACGIH: American Conference of Government Industrial Hygienists (United States of America).
‡ COSHH: Control of Substances Hazardous to Health (United Kingdom).

WARNING

Risk of personal injury

Do not touch the heating and cooling module during run time and for 1 hour after finishing a run as it might be hot.

2.5 Waste disposal

CAUTION

Disposal of plasticware

Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

2.6 Maintenance safety

Perform the maintenance as described in Section 6. QIAGEN charges for repairs that are required due to incorrect maintenance.

WARNING/ CAUTION

Risk of personal injury and material damage

Only perform maintenance that is specifically described in this user manual.

WARNING/ CAUTION

Risk of electric shock

Do not open any panels on the STAR Q Swab AS instrument.

Only perform maintenance that is specifically described in this user manual.

CAUTION

Damage to the instrument

Do not use solvents or reagents containing acids, alkalis or abrasives to clean the STAR Q Swab AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

CAUTION

Damage to the instrument

Autoclaving cannot be used for instrument components or accessories (channels, transport tools, heater shaker, heating and cooling module, carriers and labware).

CAUTION

Damage to the instrument

Ethylene oxide fumigation may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION

Damage to the instrument

Hydrogen peroxide fumigation leads to bleaching or discoloration of many instrument materials and may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION

Damage to the instrument

Do not use formaldehyde fumigation or chlorine oxides (chemical compounds of chlorine and oxygen such as bleach). They are not suitable for the STAR Q Swab AS instrument because of chemical reaction and corrosion.

CAUTION

Damage to the instrument

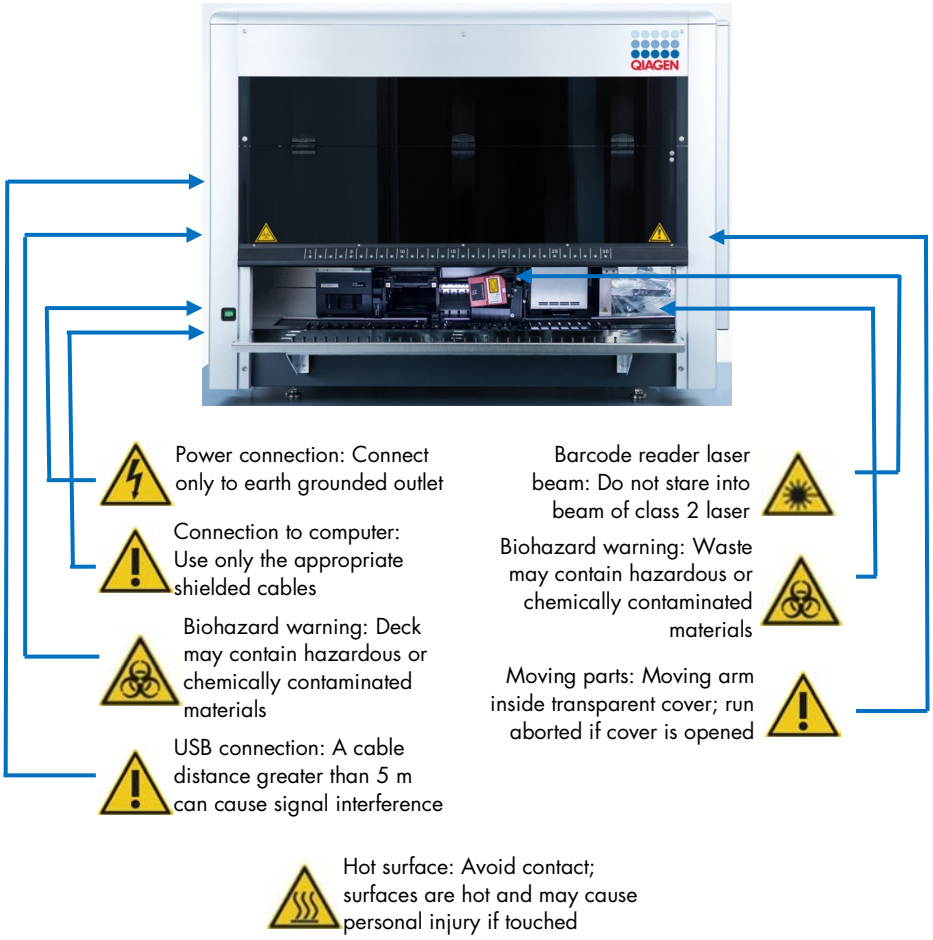
UV irradiation causes many synthetic materials to become brittle. This may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

2.7 Symbols on STAR Q Swab AS

Symbol	Location	Description
	Type plate on the instrument	Manufacturer
	Type plate on the instrument	Waste Electrical and Electronic Equipment (WEEE)
	Type plate on the instrument	FCC mark of the United States Federal Communications Commission
	Type plate on the instrument	RoHS mark for China (the restriction of the use of certain hazardous substances in electrical and electronic equipment)
	Type plate on the instrument	RCM mark for Australia/New Zealand
SN	Type plate on the instrument	Serial number
GTIN	Type plate on the instrument	Global trade item number
	On the instrument	General warning sign
	On the instrument	Warning, dangerous voltage
	On the heater shaker	Warning, hot surface

Symbol	Location	Description
	On the barcode reader	Warning, laser
	On the instrument	Warning, biological hazard

Location and explanation of warning and attention labels:

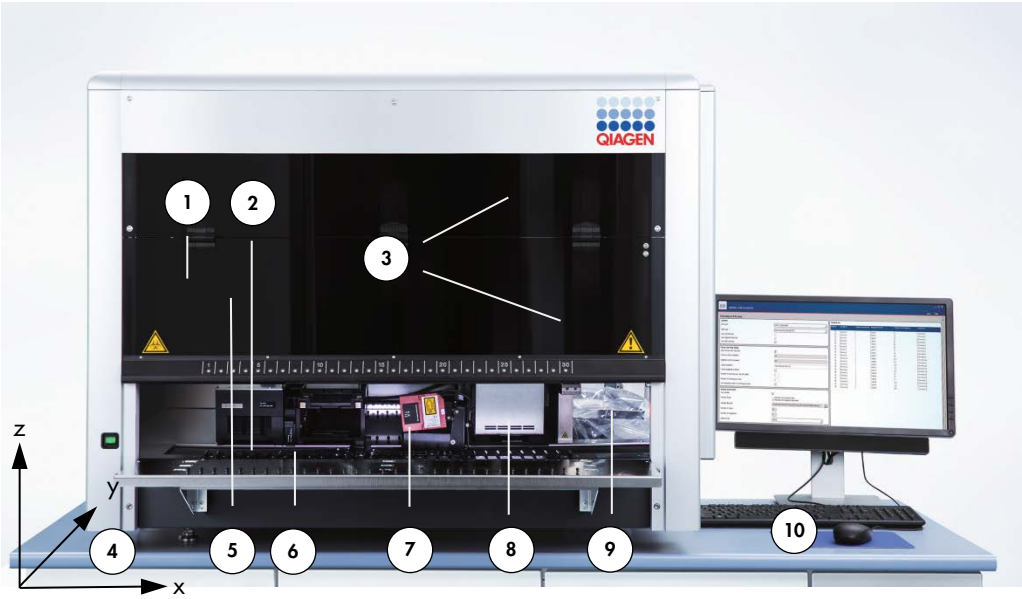


3 General Description

The STAR Q Swab AS instrument performs pipetting operations of liquids between containers and transfers microplates placed on the work surface. Pipetting is the transfer of small quantities of liquid from one container to another by aspirating (drawing) liquid from a source container then transferring and dispensing (dropping) it into a target container.

3.1 Platform

The STAR Q Swab AS instrument work surface, the deck, is used for placing loadable carriers. The carriers are available in two different sizes and hold reagent containers, such as microplates or other kinds of labware. For a comprehensive list of input and output labware, see "Labware for STAR Q Swab AS," page 81.



1	Pipetting arm	**6**	Loading tray
2	Deck	**7**	Autoload drive
3	Front cover frame and window	**8**	Carrier
4	Pipetting axes and coordinates (x, y, z)	**9**	Waste station
5	Pipetting channel	**10**	Computer

CAUTION

Loss of data

Do not open the front cover during a run. An aborted run, that is one stopped by opening the front cover, cannot be recovered. To open the window during a run, click **Pause** in the run screen, wait until the instrument stops and then open the window.

The instrument is fully covered by an acrylic glass hood. The front cover consists of a hinged transparent window made of acrylic glass. The window is equipped with a magnetic switch that is monitored during a run. Opening the cover will abort the run.

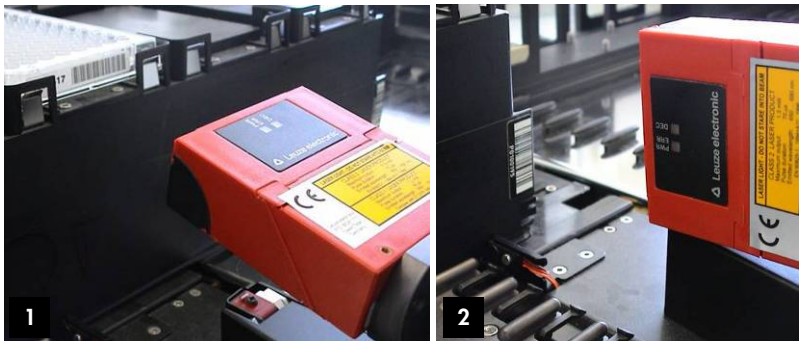
The instrument deck is divided into 30 equal tracks (T) for loading carriers in predetermined positions. This eliminates the need for precise measurement of positions. The deck has partitions of 22.5 mm, equivalent to 1-T. The labware carriers are adapted to the partitions: 6-T carriers for microplates or Compression-induced O-Ring Expansion (CO-RE) tips and other labware. An additional partition provides space for the tip waste. The deck partitions accommodate a maximum of 30 1-T carriers for sample tubes (when applicable), or a maximum of five 6-T carriers for microplates and CO-RE tips. A total of 25 SBS (Standard format of the Society for Biomolecular Screening) positions can be placed onto the STAR Q Punch AS deck.

The instrument's internal coordinate (x, y, z) system is shown in the picture above, located at its origin. Please note that the ZERO position is 100 mm below the metal deck sheet.

3.2 Autoload function

The Autoload drive is a device enabling automatic loading of carriers onto the STAR Q Swab AS instrument deck. The features of the Autoload are:

- Moves in x-direction,
- Shunts carriers onto and off the deck
- Reads the barcodes of microplates and tip trays in carriers



The Autoload option including the barcode reader is shown reading horizontally (1) for plates and vertically (2) for carriers and tubes.

Carrier identification by barcodes and reading of barcodes on plates is possible in combination with the Autoload drive. Barcodes of tip trays and racks are read automatically when loading tips to exclude the risk of mixing up tip types. This method is suitable for all tip types.

Tip carrier with five bar-coded tip trays loaded.

The following barcode types can be read by the Autoload:

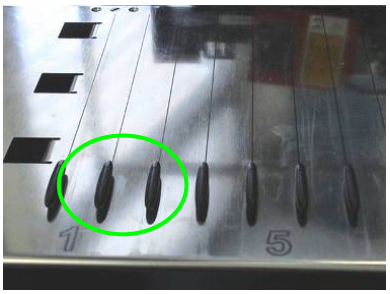
- ISBT Standard
- Code 128 (Subset B and C)
- Code 39
- Codabar
- Code 2 of 5 interleaved
- UPC A

Barcodes must be black bars on white background. We recommend using the barcode type Code 128 (Subset B and C).

Note: Barcodes must have a minimum readability (i.e., good contrast, size, correct orientation and distance between bars) to be fully functional. Make sure that the barcode is in the correct orientation for plates. For details of barcodes, see the specifications given in "Autoload: barcode and reader specifications," page 84.

3.3 Carriers

Labware such as plates are placed on a carrier loaded onto the STAR Q Swab AS instrument deck. Standard carriers are loaded to the deck by the Autoload drive. Carriers are inserted into the tracks between the front and rear slide blocks of the Autoload tray until they touch the stop hooks on the far side of the tray.



Slide blocks for carriers.

Stop hooks for carriers.

3.3.1 Multiflex carrier

The Multiflex carrier consists of a multiple-use carrier base providing space for up to 5 modules. Several modules are provided with the STAR Q Swab AS instrument: tip rack module, microplate module, plate stacker module, module for heating or cooling labware, reagent trough module, tube or cup module or modules for other labware.

The modular design of the Multiflex carrier allows optimization of space and customizing of the instrument. This carrier will occupy 6 tracks of the instrument deck.

1 Heating cooling module
2 Lid park module
3 Heater shaker

3.4 Heater shaker

The heater shaker (HS) is designed to heat and/or shake standard microplates in SBS format.

The shaking speed is predefined according to the labware used. The HS is a compact module designed for operation on the STAR Q Swab AS instrument. It is not a stand-alone product. Specific adapters are required for efficient and evenly distributed heating of plates.

3.4.1 Loading of labware on heater shaker

WARNING **Risk of personal injury**

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.

The appropriate labware is loaded automatically by using the CO-RE gripper from the STAR Q Swab AS instrument.

Plates are placed on the HS without lids since a lid is not locked during a shaking process. Before heating or shaking is started, the plates are locked and positioned in the center of the HS. When heating or shaking has finished the plates are unlocked and are removed from the HS.

3.5 Heating and cooling module

The heating and cooling module heats or cools plates. The temperature range for the heating module is from ambient +5°C to 65°C. The temperature range for the cooling module is from 15°C to 4°C. A temperature selection dial is located on the top of the module for setting the desired temperature. The status LED OFF indicates the heating and cooling module is coming to temperature. When the LED is ON, the temperature of the Labware adapter is within ±1°C of the desired temperature.

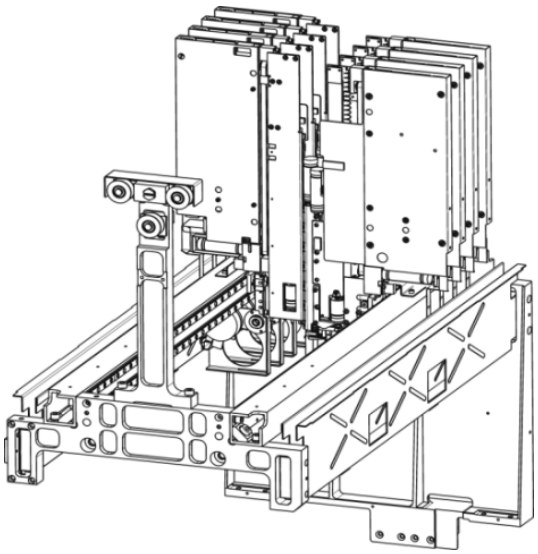
WARNING **Risk of personal injury**

Do not touch the heating and cooling module during run time and for 1 hour after finishing a run as it might be hot.

3.6 Pipetting

3.6.1 Modular pipetting arm

The modular pipetting arm contains a set of eight 1000 µl pipetting channels which work independently.



The minimum distance between two 1000 µl pipetting channels on the arm is 9 mm.

3.6.2 System pipetting configuration

The STAR Q Swab AS instrument has eight 1000 µl pipetting channels working in parallel for simultaneous transfer of liquids. Each pipetting channel moves independently on the y-axis, as well as the z-axis. Each channel uses its own high-precision motors and electronics to reach the pipetting position.

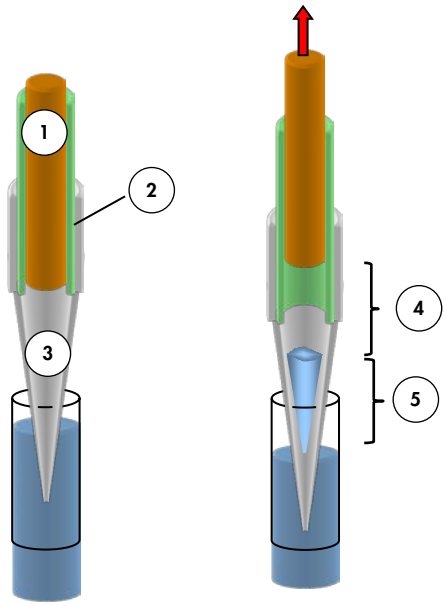
1000 µl pipetting channel.

Note: The system reports an error if pipetting positions outside the access range of the instrument are used.

The 1000 µl pipetting channels have a set "traverse height" of 245 mm above the origin, or 145 mm between the top of the disposable tip and the deck of the instrument. This means that when a channel moves from one location on the deck to another, it automatically does so at that particular height. This is a safety precaution to prevent the channels from colliding with items that may be on the deck.

3.6.3 Air displacement pipetting

The pipetting operation is based on the air displacement pipetting principle, comparable to the functioning of handheld pipets. Air displacement means that the liquid is aspirated into and dispensed from a disposable tip by the movement of a plunger. Only air is present between the plunger and the liquid surface and no system liquid of any kind is involved in the instrument.



1	Plunger	**4**	Air
2	Barrel	**5**	Liquid
3	Tip		

Pipetting with the STAR Q Swab AS instrument is identical to pipetting with a handheld plunger pipette. The pipetting head's barrel and plunger are not intended to be cleaned.

3.6.4 Liquid level detection

The liquid level in a container can be detected before aspiration of the liquid by the liquid level detection (LLD) feature of the STAR Q Swab AS instrument. LLD is based on either capacitive (cLLD) or pressure (pLLD) signal detection. Usually cLLD is used for conductive liquids. The sensitivity of the cLLD depends on the vessel size, volume and the conductivity (or polarity) of the liquid to be detected.

For non-conductive liquids, or where there is an insufficient coupling between container bottom and carrier, pLLD is used; pLLD only works with new and empty tips for the aspiration of liquids and is available on the individual pipetting channels only.

In cases of LLD under demanding circumstances, e.g., foaming liquids, cLLD and pLLD can be used at the same time.

3.6.5 Disposable tips

A variety of disposable tips is designed for use with 1000 µl 8-channel pipetting heads.

The following table shows the disposable tips used for pipetting.

Tip	Example
50 µl tip	
1000 µl CO-RE tip	

CO-RE tips are the only tips designed to work with the STAR Q Swab AS instrument and have been developed to meet the demands of the most flexible and reliable automated pipetting tasks. Channels lock on to the tip rather than the standard method of forcing a tip on a mandrel. This design assures superior tip alignment, seals the tip to the pipette channel, eliminates tip distortion and mitigates aerosol contamination.

The use of non-CO-RE tips is not supported on the STAR Q Swab AS instrument. Non-CO-RE tips do not have the annular space to receive the O-ring. Use of non-CO-RE tips may result in unintended deformation of the O-ring and the tip material itself. It may lead to misalignment of the tip, improper sealing, reduced O-ring life, improper drop-off and potential aborted runs from randomly dropped tips. Therefore, QIAGEN does not support the use of non-CO-RE tips on the STAR Q Swab AS instrument.

Important: Only CO-RE disposable tips should be used with the pipetting channels of the STAR Q Swab AS instrument. Other tips may cause contaminated or damaged pipetting channels.

Note: Pipetting specifications are only guaranteed when using CO-RE tips.

Disposable CO-RE tips are produced under clean room conditions (class 8), based on ISO 14644 standards. "Biological purity tested" tips are free of DNA, DNase/RNase, PCR inhibitors and endotoxin (non-pyrogenic). In addition to these criteria, "Biological purityPLUS" tips are sterile, according to ISO 11135, and free of ATP.

- Filter tips prevent aerosol contamination.
- Conductive (black) tips are specifically designed for cLLD

Note: Make sure to match the tip type(s) used with the method and channel.

3.6.6 Tip recognition

The tips used in a pipetting procedure are matched with the pipetting channel to prevent damage to the instrument. The STAR Q Swab AS instrument uses two methods for recognition of the tip type. All tip trays and racks have color-coded barcode labels for automated recognition.

The color and text on the barcode labels distinguish the tip volumes by eye.

Tip volume	Barcode label	Color code
50 µl		Light red
1000 µl		White

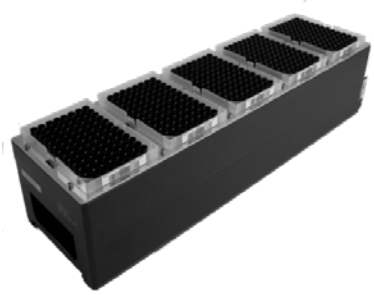
3.6.7 Tip packaging

All CO-RE disposable tip types are available in trays with a sealed paper lid (blister pack). The tip trays are barcode labeled for automatic identification during the loading process. QIAGEN instruments are able to check for loading of the correct tip type via the barcode reader.

Tray with 1000 µl tips.

Tray with 50 µl tips.

The trays are compatible with the respective tip carriers.



Tip carrier containing 5 tip trays.

Tips for pipetting sample volumes from 1–50 µl

The low-volume CO-RE tip, 1–50 µl, is available as a conductive (black) tip for use with cLLD, with filter for use with 1000 µl channels. The 1–50 µl tip is compatible with the MAD feature.

CO-RE tips, 1–50 µl, come in trays of 96 tips. One blister pack contains 5 trays.

Tips for pipetting sample volumes from 10–1000 µl

The CO-RE tip, 10–1000 µl, is available as a conductive (black) tip for use with cLLD, with filter for use with 1000 µl channels. It is compatible with the MAD feature.

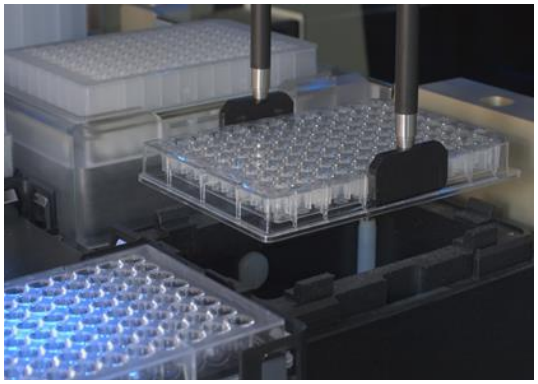
CO-RE tips, 10–1000 µl, come in trays of 96 tips. One blister pack contains 5 trays.

Note: Observe caution when using the CO-RE tips 10–1000 µl and 1–50 µl on the same system. Do not mix up one tip type with the other during the process of loading the deck. The wrong tip causes bad pipetting results and/or damaged pipetting channels. The Autoload function is used for loading tip carriers.

3.7 CO-RE gripper

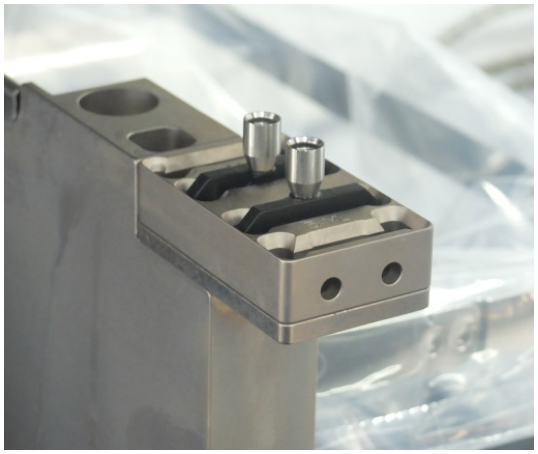
The CO-RE gripper is a plate handling tool picked up by two pipetting channels.

The traverse height of the channels with the gripping jaws is the same as with tips: 145 mm above the deck.



CO-RE gripper on the pipetting head.

The holder of the two gripping paddles is on the waste block.



Gripping paddles in park position in the waste block.

3.8 Computer requirements

STAR Q Swab AS is controlled by dedicated STAR Q Swab AS Software which manages all functions of the daily work routine.

QIAGEN offers standard computers for use with the software. For specifications of the QIAGEN standard computers, refer to "QIAGEN standard computer specifications," page 80.

Note: Computer requirements as well as operating systems described in this manual are subject to change without notice.

The STAR Q Swab AS instrument configuration and the processor board implemented have the following interfaces for linking the instrument to the control computer:

- Serial interface RS-232C with dual processor board
- Unified Serial Bus (USB) interface with dual processor board and LAN dual processor board
- Ethernet with LAN dual processor board

The communication interface used on the computer is set by the configuration editor. For further information about the recommended computer model refer to "QIAGEN standard computer specifications," page 80, and "Electronics and interfaces," page 32.

To avoid data loss, use of an uninterruptible power supply (UPS) for the computer is recommended.

3.8.1 STAR Q Swab AS Software

The STAR Q Swab AS Software provides everything needed to control the STAR Q Swab AS instrument.

It is a Microsoft® Windows®-based, menu-driven interface allowing the user to run the instrument.

Note: STAR Q Swab AS function has been verified using Windows 7. Running the instrument under any other operating system may lead to severe problems and/or malfunction.

If not using a QIAGEN computer, the customer must make sure that a suitable control computer is available for installation of the STAR Q Swab AS Software. The STAR Q Swab AS instrument will be unpacked and installed and the initial set-up will be performed by a trained QIAGEN Field Service Specialist or service technician of an authorized agent.

3.8.2 Security and data protection

Use the necessary precautions against software viruses. Use only manufacturer's original installation DVD/CD-ROM sets for installation of the operating system.

Running other software in parallel to the STAR Q Swab AS Software may negatively affect the operation of the STAR Q Swab AS instrument.

Any manipulation to the software data files or other information determining or affecting the functions of the STAR Q Swab AS instrument can result in erroneous test results or instrument failure.

Only the STAR Q Swab S Software may be used to control the instrument.

For reasons of data security and integrity, the use of an uninterrupted power supply (UPS) is recommended, since a loss of power may cause data to be lost or corrupted.

To avoid computer breakdowns, configure a hard disk of sufficient space in the computer. Make sure that there is always enough storage capacity on the hard drive. Delete the log files from time to time. Generated data within the log files directory, e.g., traces and pipetting files, should be backed up on the laboratory's host device and deleted from the control computer's hard disk at weekly intervals. See "Log files," page 59, for more information.

3.8.3 Electronics and interfaces

All the electrical connections are placed on the left side of the instrument, as shown below:

1	TCC1	**7**	Extensions I/O
2	TCC2	**8**	DIV 2
3	External CAN	**9**	DIV 3
4	Power 1	**10**	DIV 1
5	Power 2	**11**	USB communication
6	Main power	**12**	RS232 communication

The main power connection is located near the front of the instrument (on the right side in the picture above). The communication connections to the computer are positioned beneath this main power connection. The STAR Q Swab AS instrument can communicate either via USB (the preferred option) or via RS232.

Important: Never use both connections, USB and RS232, together!

Note: Do not attempt to install a 3rd party device via the electrical connections of the STAR Q Swab AS instrument on your own! Always consult a local QIAGEN representative for installation.

The heater shaker and heating and cooling module are powered via the connectors labeled “TCC 1” and “TCC 2”.

The connectors labeled “Power 1” and “Power 2” provide different power supply voltages. There is also a CAN bus for communication.

The connectors “DIV 1”, “DIV 2”, “DIV 3” and “Extensions I/O” deliver several digital input/output signals as well as pulse-width-modulated (PWM) outputs, CAN bus and the TTL levels.

3.9 Power/voltage

Make sure that the instrument is connected to a 100/115/230 VAC (50 or 60 Hz) socket. The instrument can be used with any voltage within the range 100–230 VAC. The main plug is on the left-hand side of the instrument at the front. We recommend using an uninterruptible power supply (UPS) for the instrument. Plug the main cables for the computer and the instrument into the same electrical outlet. Connect them only to a grounded outlet.

Ensure that the instrument is correctly grounded when connected to the electrical outlet.

The fuses for the instrument are placed in the main power socket (see picture below). During installation/IQ, the appropriate fuse is selected by the QIAGEN Field Service Specialist.

Note: When replacing a fuse make sure to use the appropriate fuse (see “Appendix B — Technical Specifications,” page 78) and place it in the main power switch before switching on the instrument.

3.10 Training

Training in operation of the STAR Q Swab AS instrument and general use of the STAR Q Swab AS Software will be provided by QIAGEN personnel at initial setup.

4 Sample Processing Using STAR Q Swab AS Kits

The purpose of the QIAGEN STAR Q Swab AS Graphical User Interface (GUI) described in this user manual is to perform the following sample processing steps, either separately or in sequence:

- Lysis of forensic reference swab samples and STR reaction PCR setup

  Minimum: 1 reaction

  Maximum: 192 reactions

All listed workflows are in association with QIAGEN reagents. To order kits, refer to "Appendix A — Ordering Information," page 77.

Important notes

- Do not exchange positions of samples and reagents, or switch microplates after they have been identified by the barcode reader. This could result in incorrect test data or an instrument crash.
- Microplates must be placed on the carrier such that well A1 is located in the top-left position.
- When pouring liquid into the containers, ensure that there is no foam on the surface of the liquid. Note that foam may cause pipetting problems.
- Do not overfill reagent containers, tubes or other liquid containers.
- Do not mix tip size and type (e.g., with or without filter, or different volumes) in the same tip rack. Make sure to match the tip types to be used with the particular method. Take care if using tips which cannot be distinguished by the tip recognition feature (refer to "Tip recognition," page 28, and "Disposable tips," page 27).
- Do not fill partially consumed tip racks with tips from other racks. Tip racks should be loaded into the tip rack carriers as they are provided in the original package. The tip racks are individually labeled with a barcode for identification.
- Do not try to open the front cover of the instrument during a run because the system will abort and this may cause a loss of data.
- When the system is paused, do not wait too long before resuming the run. Loss of liquid from a full tip may result in invalid data.
- Discard used tips. Do not reuse them.
- Do not empty the tip waste during a run.
- Do not leave tips on the pipetting channels for a long period of time, e.g., overnight. This may cause damage to the CO-RE O-rings. A daily maintenance procedure will remove the tips.

For routine use of the STAR Q Swab AS instrument, refer to the Quick Start Guide.

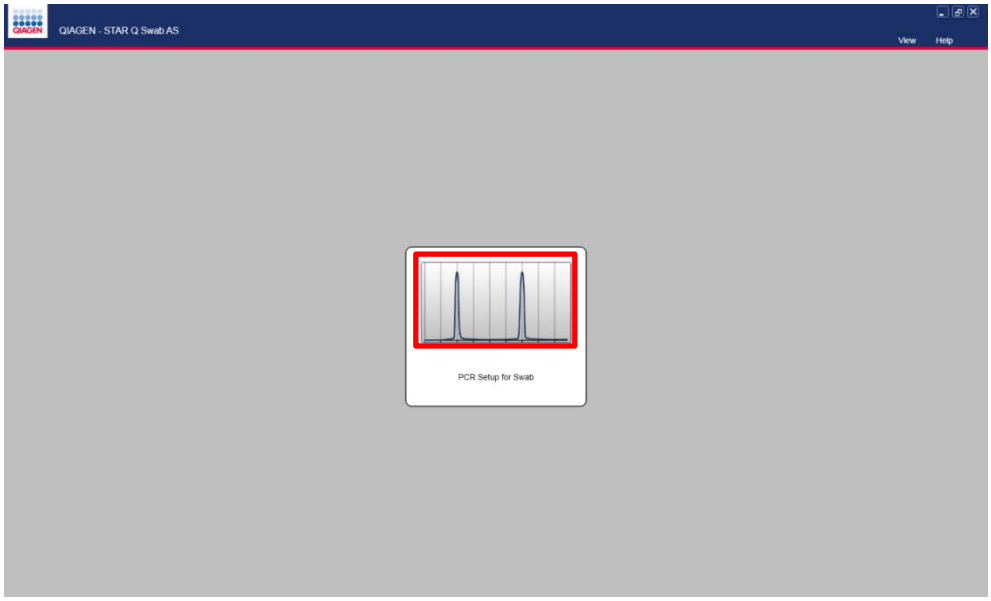
4.1 Lysis of forensic reference swab samples and STR reaction PCR setup

Note: Refer to information in the appropriate kit handbook before starting a run.

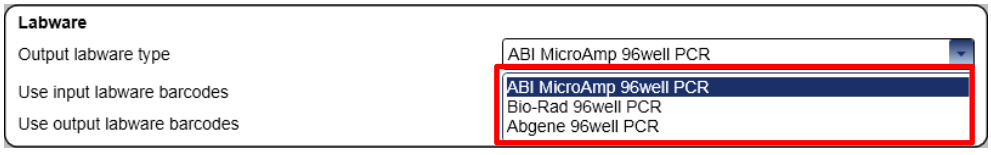
4.1.1 Setup of the run specifications

1. Launch the QIAGEN user interface from the computer desktop.

2. Enter the run specifications by choosing **PCR Setup for Swab**.



3. In the **Labware** panel, select the PCR output plate type. For a comprehensive list of labware, see "Labware for STAR Q Swab AS," page 81.



Note: The system is configured for the following PCR output plates:

- "ABI MicroAmp 96well PCR" plate (Applied Biosystems® MicroAmp® 96-well plate, cat. no. N8016154)
- "Bio-Rad 96well PCR" plate (Bio Rad® Microseal® 96-well PCR plate, cat. no. HSP 9901)
- "Abgene 96well PCR" plate (Abgene® Thermo Fisher, PCR Plate, 96-well, semi-skirted, raised deck, cat. no. AB1100)

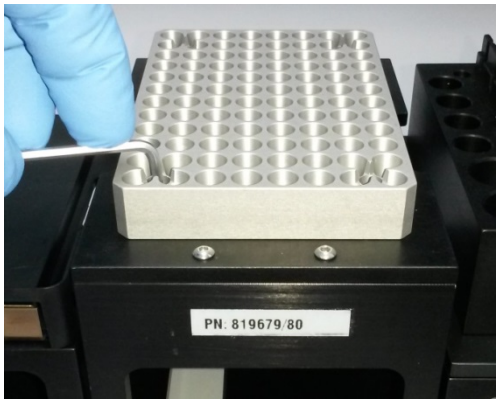
Important: If the user chooses the "Bio-Rad 96well PCR" plate, the instrument PCR plate positions must be modified according to the following workflow.

Modify both PCR plate positions on the carrier according to this procedure. Both positions must be adapted to the same type of PCR plate.

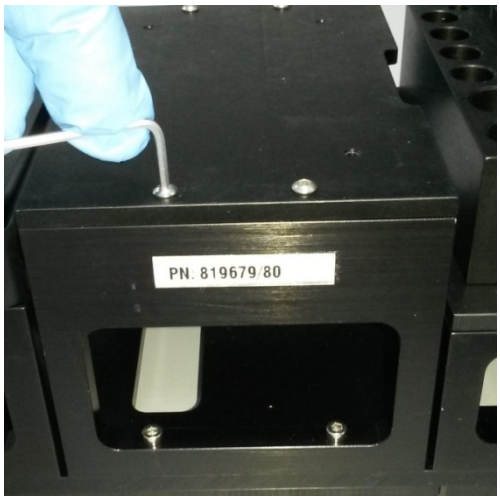
Example of an unmodified carrier:

3a. Using a hex tip screwdriver, unscrew the 4 screws attaching the PCR plate holder to the PCR plate adapter on the carrier.

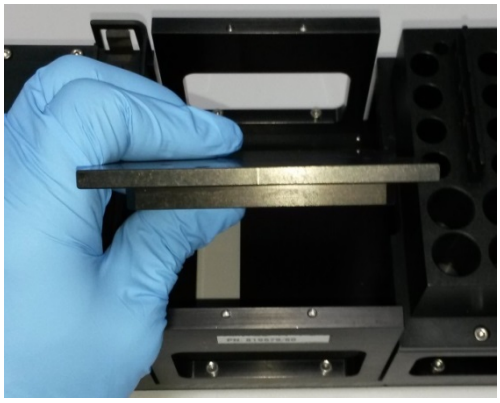
The black plate underneath the silver PCR plate holder is the PCR plate adapter:



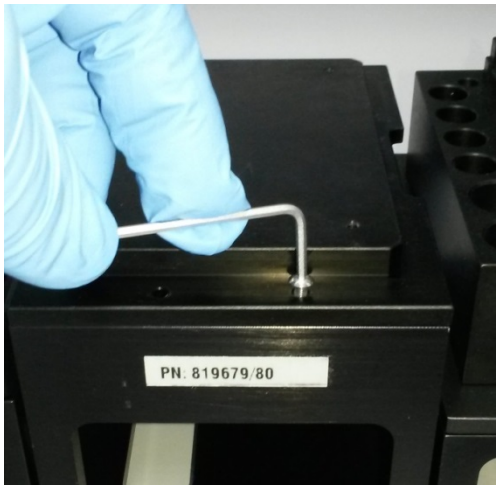
3b. Remove the 4 screws from the PCR plate adapter.



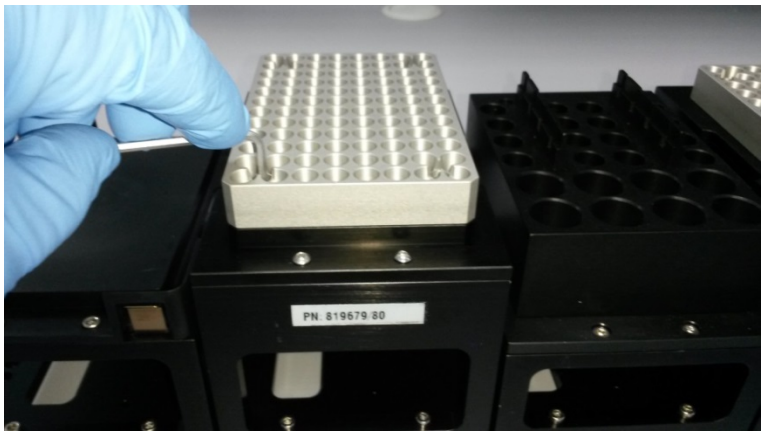
3c. Flip the PCR plate adapter.



3d. Replace and tighten the 4 screws in the PCR plate adapter.



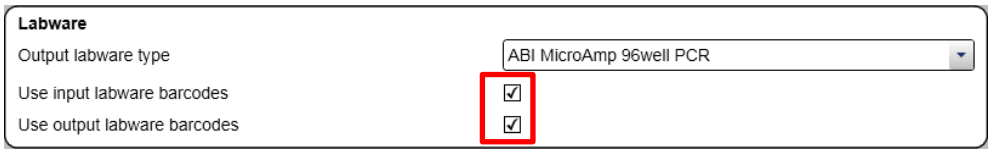
3e. Place the PCR plate holder on the repositioned PCR plate adapter. Replace and tighten all 4 screws on the PCR plate holder.



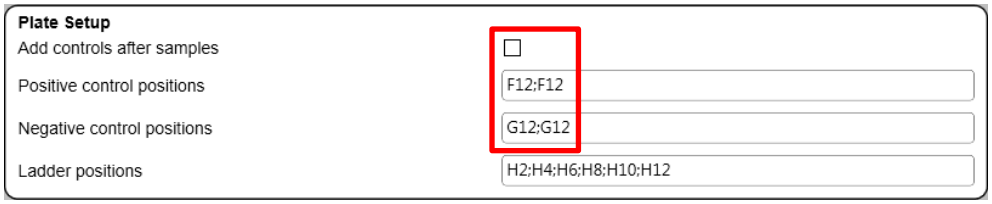
Example of one PCR plate position modified (left) and one unmodified PCR plate position (right):

3f. Repeat the procedure for the other PCR plate position.

4. In the **Labware** panel, select if barcodes on the input and/or output labware are to be used.

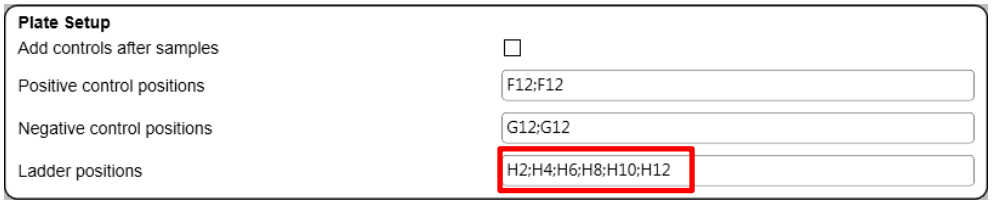


5. In the **Plate Setup** panel, select if the positive and negative controls should be added after the samples. Alternatively, dedicated positions for the positive and negative controls can be entered manually.

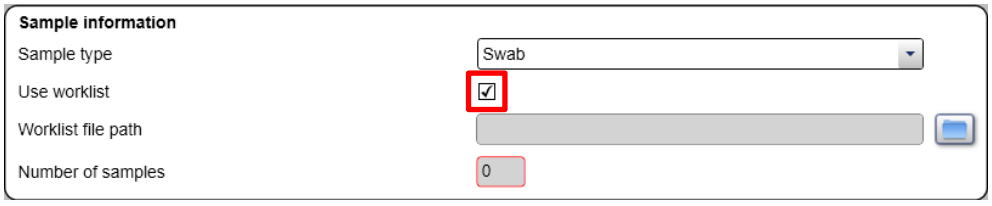


Note: When more than one PCR output plate is processed, the positions for the positive and negative controls must be entered for all PCR output plates as shown above. The positions for the positive and negative controls may differ on the different PCR output plates.

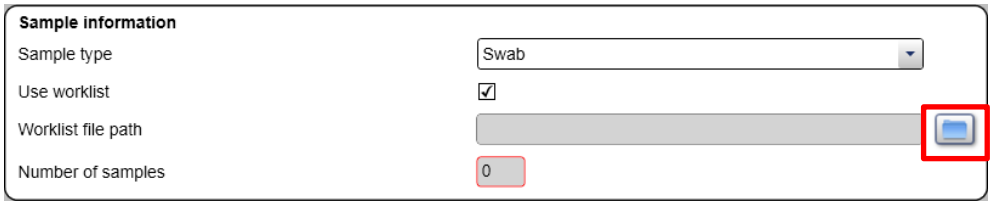
6. In the **Plate Setup** panel, manually enter the positions for the allelic ladder. These positions are left empty during the PCR setup.

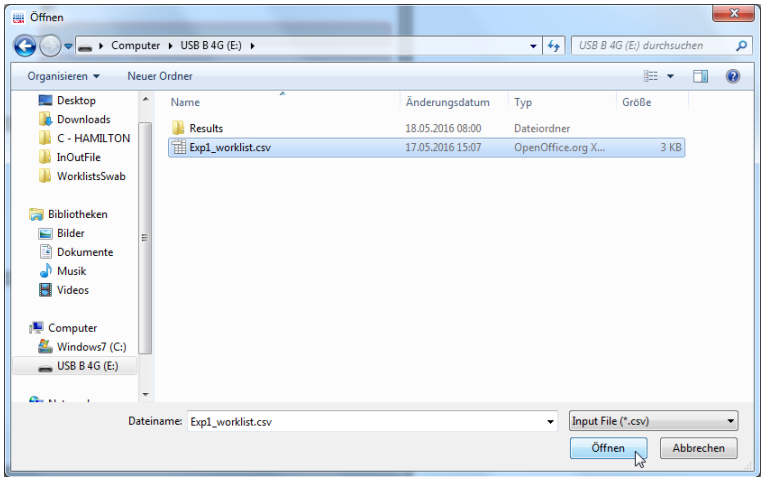


7. In the **Sample information** panel, select if a worklist should be used.



If you are using a worklist, click on the blue folder icon, browse to the worklist and load your worklist.





Example of a worklist in Microsoft Excel®:

	A	B	C	D
1	SampleID	InputPlateBarcode	WellPosition	Comments
2	Sample_ID_1	1	A1	Comment_1
3	Sample_ID_2	1	B1	Comment_2
4	Sample_ID_3	1	C1	Comment_3
5	Sample_ID_4	1	D1	Comment_4
6	Sample_ID_5	1	E1	Comment_5
7	Sample_ID_6	1	F1	Comment_6
8	Sample_ID_7	1	G1	Comment_7
9	Sample_ID_8	1	H1	Comment_8
10	Sample_ID_9	1	A2	Comment_9
11	Sample_ID_10	1	B2	Comment_10
12	Sample_ID_11	1	C2	Comment_11
13	Sample_ID_12	1	D2	Comment_12
14	Sample_ID_13	1	E2	Comment_13
15	Sample_ID_14	2	A1	Comment_14
16	Sample_ID_15	2	B1	Comment_15
17	Sample_ID_16	2	C1	Comment_17
18	Sample_ID_17	2	D1	Comment_18
19	Sample_ID_18	2	E1	Comment_19
20	Sample_ID_19	2	F1	Comment_20
21	Sample_ID_20	2	G1	Comment_21
22	Sample_ID_21	2	H1	Comment_22
23	Sample_ID_22	2	A2	Comment_23
24	Sample_ID_23	2	B2	Comment_24
25	Sample_ID_24	2	C2	Comment_25
26	Sample_ID_25	2	D2	Comment_26
27	Sample_ID_26	2	E2	Comment_27

Note: The worklist must be in .csv file format and the layout must be as shown above. Sample IDs must be unique. If two VWR® 96-well plates are used as input plates and no input plate barcodes are used, the plates must be distinguished in the worklist with the identifiers 1 and 2 as shown above.

After a worklist is loaded, the sample list is shown in the right-hand **Sample list** panel. All samples are automatically selected. Uncheck the **Selected** box if a particular sample should not be processed.

Sample List

Selected	Sample ID	Input Plate Barcode	Well Position	Comments
☑	Sample_ID_1	1	A1	Comment_1
☑	Sample_ID_2	1	B1	Comment_2
☑	Sample_ID_3	1	C1	Comment_3
☑	Sample_ID_4	1	D1	Comment_4
☑	Sample_ID_5	1	E1	Comment_5
☑	Sample_ID_6	1	F1	Comment_6
☑	Sample_ID_7	1	G1	Comment_7
☑	Sample_ID_8	1	H1	Comment_8
☑	Sample_ID_9	1	A2	Comment_9
☑	Sample_ID_10	1	B2	Comment_10
☑	Sample_ID_11	1	C2	Comment_11
☑	Sample_ID_12	1	D2	Comment_12
☑	Sample_ID_13	1	E2	Comment_13
☑	Sample_ID_14	2	A1	Comment_14
☑	Sample_ID_15	2	B1	Comment_15
☑	Sample_ID_16	2	C1	Comment_17
☑	Sample_ID_17	2	D1	Comment_18
☑	Sample_ID_18	2	E1	Comment_19
☑	Sample_ID_19	2	F1	Comment_20
☑	Sample_ID_20	2	G1	Comment_21
☑	Sample_ID_21	2	H1	Comment_22
☑	Sample_ID_22	2	A2	Comment_23
☑	Sample_ID_23	2	B2	Comment_24
☑	Sample_ID_24	2	C2	Comment_25
☑	Sample_ID_25	2	D2	Comment_26
☑	Sample_ID_26	2	E2	Comment_27

8. In the **Sample information** panel, if no worklist is used, enter the number of samples manually.

Sample information

Sample type: Swab

Use worklist: ☐

Worklist file path:

Number of samples: 176

9. In the **Kit information** panel, select the kit to be used.

Kit information

Kit type: Investigator 24plex GO! Kit

- Investigator 24plex GO! Kit
- Investigator ESSplex SE GO! Kit
- Investigator IDplex GO! Kit

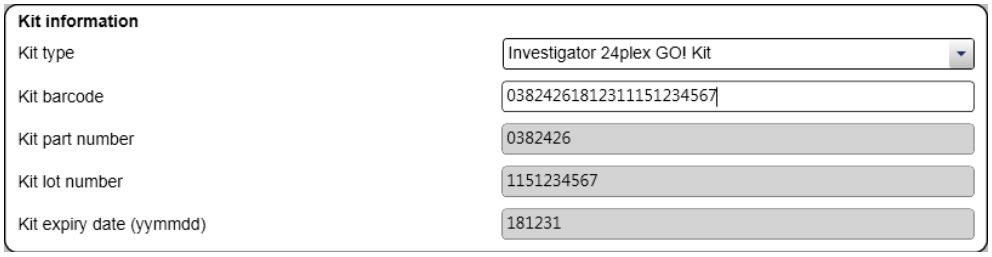
Kit barcode

Kit part number

Kit lot number

Kit expiry date (yymmdd)

10. In the **Kit information** panel, scan the kit barcode into the **Kit barcode** field. The grayed-out fields will automatically populate with the relevant kit details.

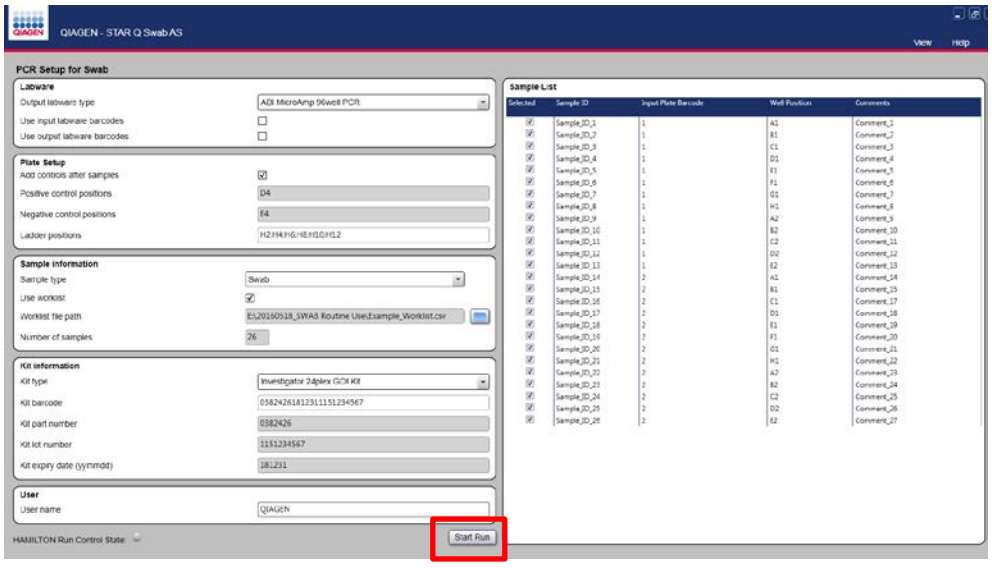


Note: The instrument will identify an out-of-date kit by highlighting the **Kit expiry date** field in red and warning the user. It is possible to continue with an out-of-date kit.

Example of a kit barcode:

11. In the **User** panel, enter a user name.

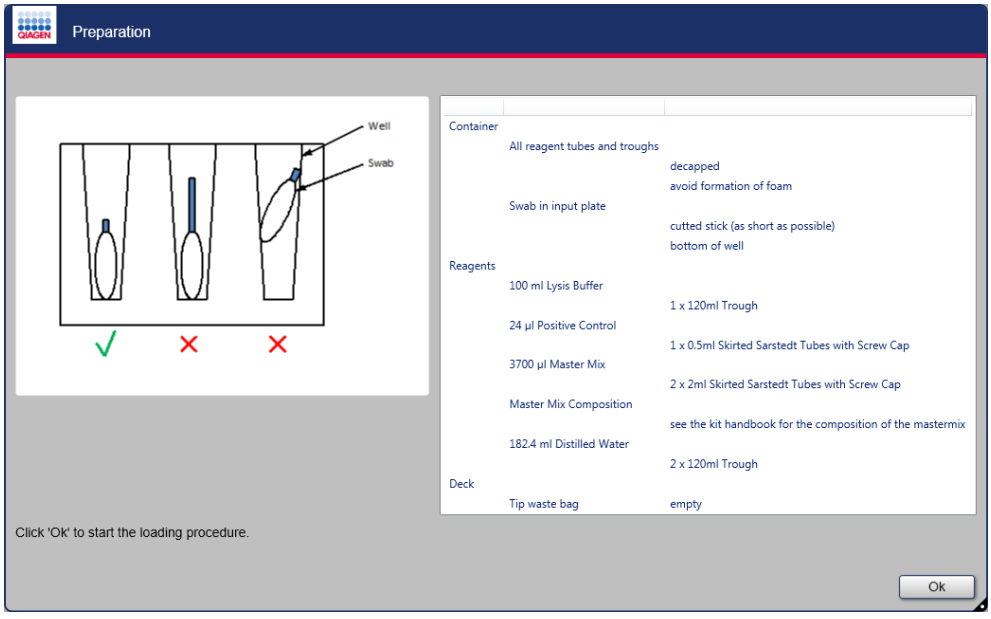
12. When setup is completed, start the run by clicking **Start Run**.



4.1.2 Loading a run

The **Preparation** window provides a list of the reagents needed as well as the tube or container type in which the reagents need to be loaded. Where a reagent must be prepared manually prior to the start of the run, the composition of the reagent is displayed.

The **Preparation** window serves as a general overview; detailed information regarding the loading of the reagents is given at a later stage in the loading process



Note: Cut the swabs as low as possible. A protruding shaft that is too long may cause pipetting problems. Make sure that the swabs are sitting on the bottom of the well.

1. Click **Ok** to begin loading.

CAUTION

Loss of data and damage to the instrument
Use only labware defined in this manual with the STAR Q Swab AS instrument. Failure to do so may result in damage to the instrument and incorrect results.

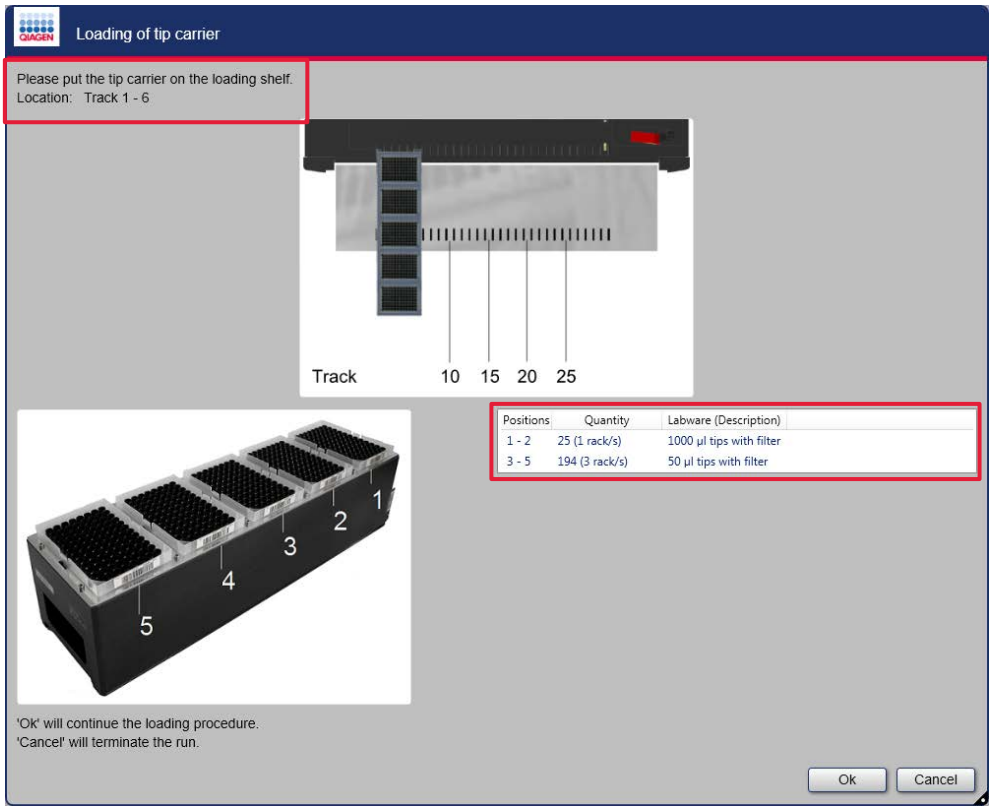
2. Make sure that the cooling module is switched on and the cooling module lid is in the correct position as indicated in the **Loading of active carrier** window.

Note: The cooling module must not be switched off individually; it will be switched off automatically when the instrument is switched off.

3. Press **Ok** to load.

   The system will perform a load check.

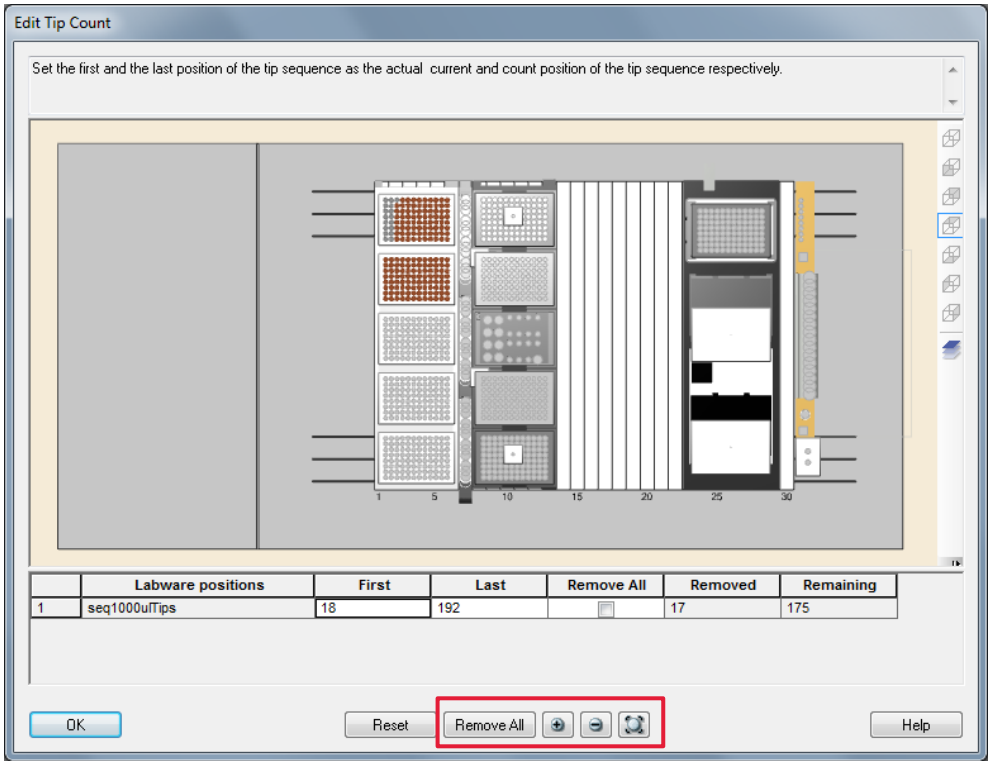
4. Load the 1000 µl and 50 µl tips in the positions indicated in the **Loading of tip carrier** window.



Note: A tip rack must be present in each location. If no tips are required in a position, load an empty tip rack in that position with barcodes facing to the right.

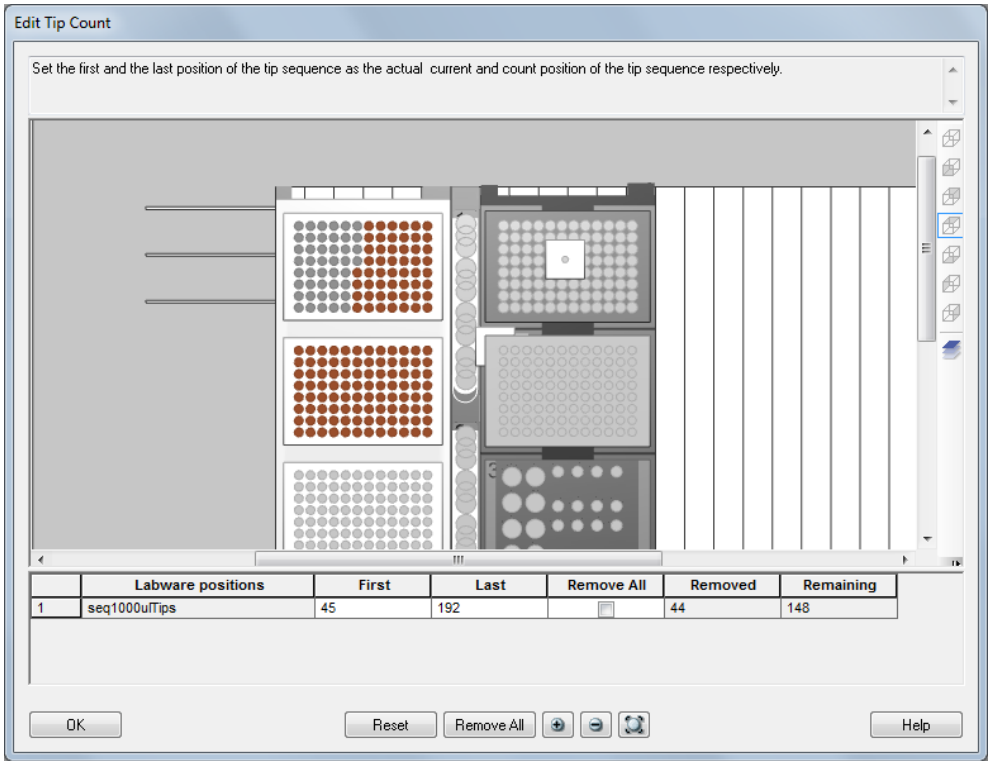
5. Press **Ok** to continue.

The **Edit Tip Count** window allows the user to enter the locations of 1000 µl and 50 µl tips being loaded. The system tracks the number of 1000 µl and 50 µl tips remaining from the previous run and displays the remaining 1000 µl and 50 µl tips in brown.



At the bottom of the window, the **Remove All** button allows the user to remove all tips from their location. Use the zoom and scaling buttons for easier viewing of the locations of the tips.

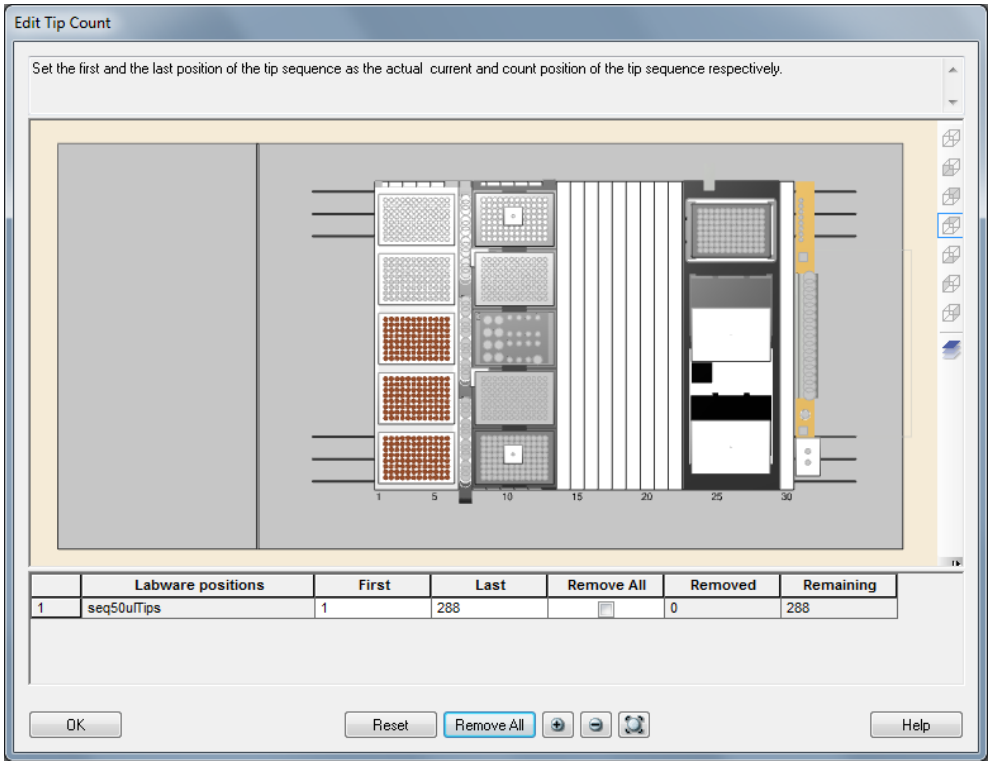
To add new tips, keep the left mouse button pressed and apply a rubber band over a tip box or a subset of tips. Tips can also be added individually by selecting them with a mouse click.



6. Click **OK** when this is done.

The second **Edit Tip Count** screen allows the user to enter the locations of 50 µl tips being loaded.

To load the correct number of 50 µl tips, follow the same steps as described above for loading the 1000 µl tips.

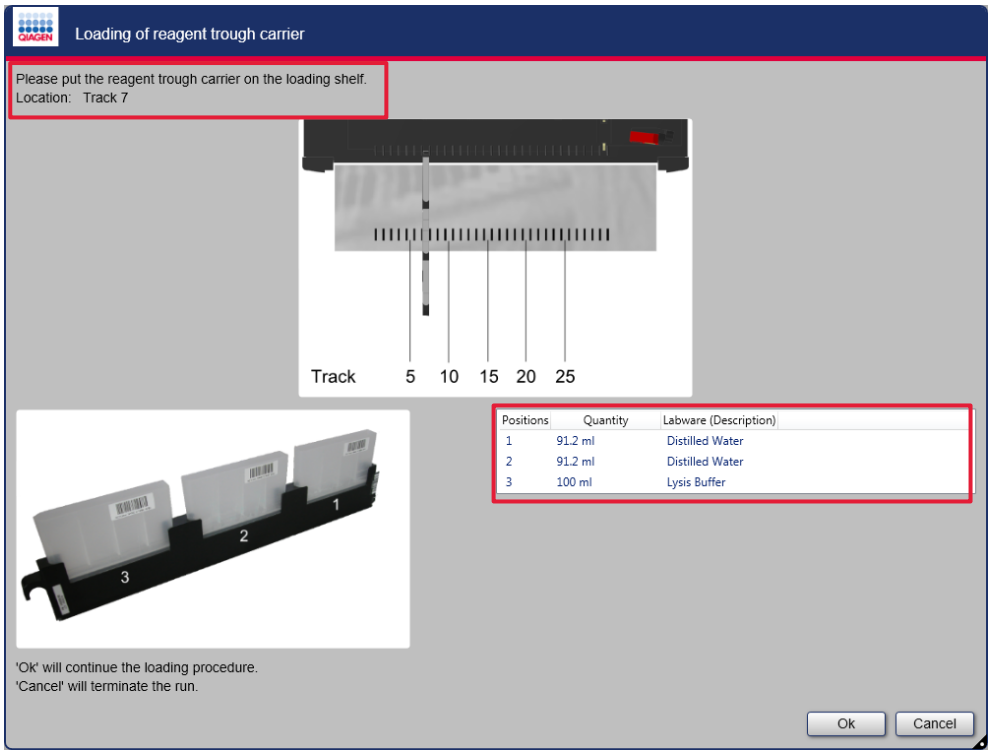


7. Click **OK** when this is done.

   The instrument will load the tip carriers.

If insufficient tips are detected a warning message will appear and the tip loading procedure will be repeated.

8. Load the reagent containers as indicated in the **Loading of reagent trough carrier** window.

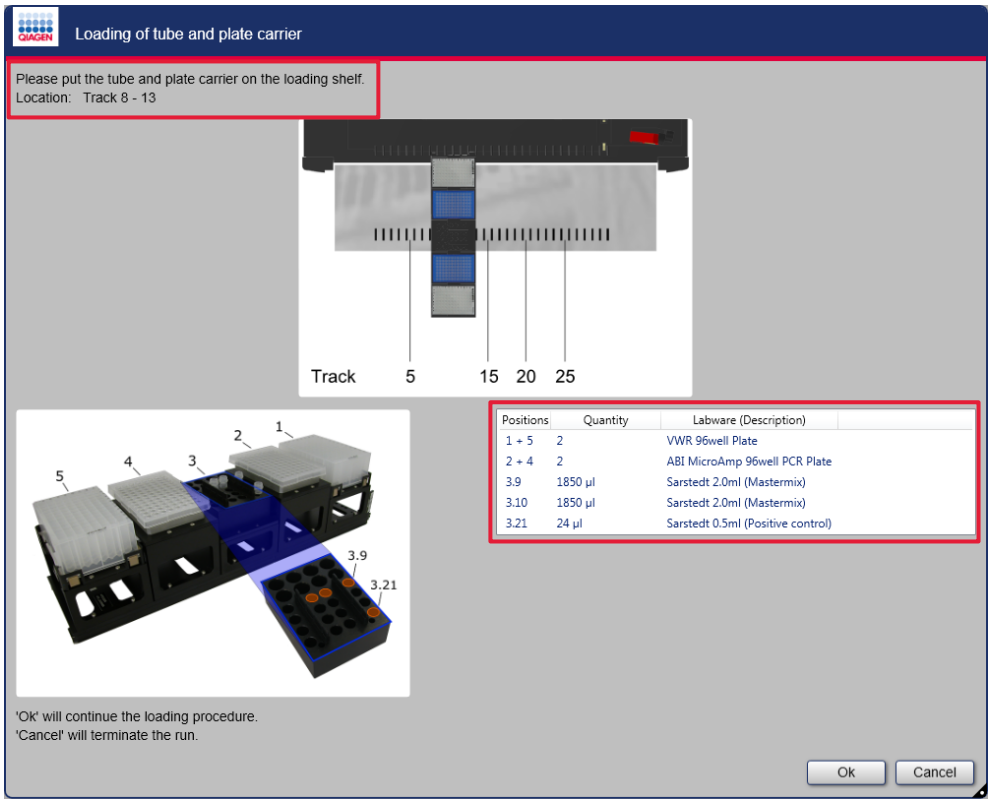


Note: Depending on the number of samples being loaded, one or two troughs with distilled, DNA-free water will be required.

9. Press **Ok** to load.

   The system will perform a load check.

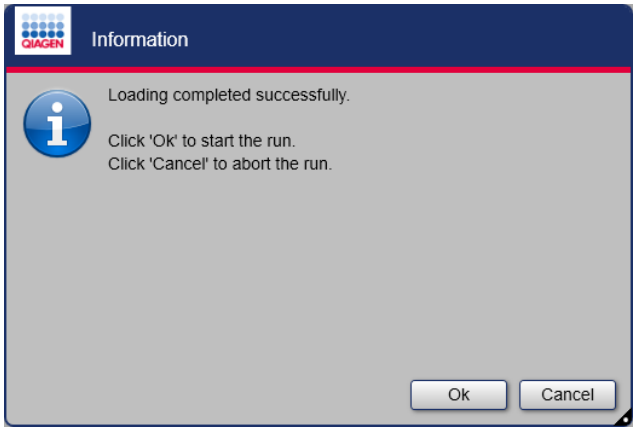
10. Load the samples (in VWR 96-well plates), the PCR output plates, the PCR master mix and the positive control as indicated in the **Loading of tube and plate carrier** window.



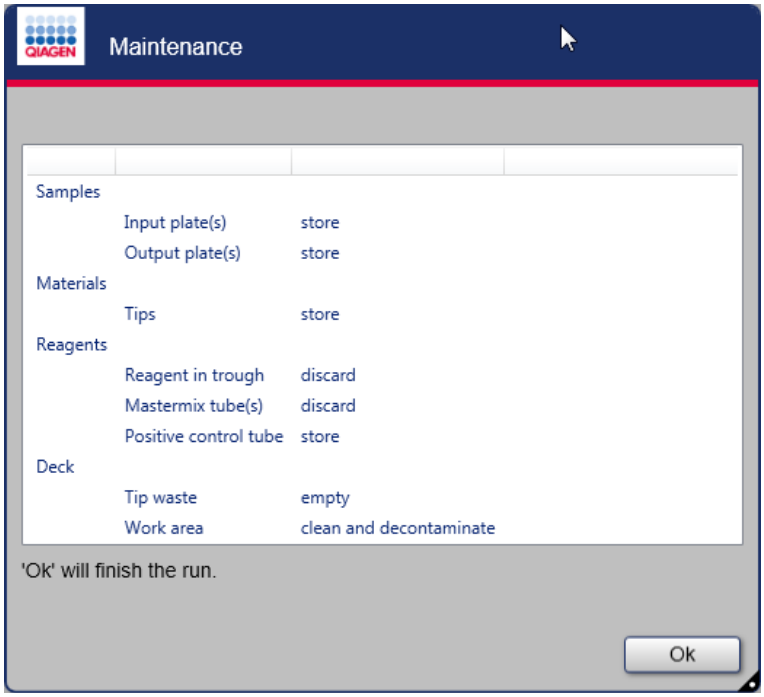
Note: Depending on the number of samples being loaded, one or more tubes with master mix will be required.

11. Press **Ok** to load. The system will perform a load check

12. Loading is complete. Press **Ok** to start the run.



After the run the **Maintenance** window displays what to do with each of the components on the STAR Q Swab AS instrument deck.



13. Press **Ok** to finish the run and close the **Run Control** environment.

4.1.3 Output files

The STAR Q Swab AS system generates two types of output files:

- *.csv. file: This file is used as a general output file summarizing the run results.
- *.txt file: This file is used as an input file for the following capillary electrophoresis (CE)

Example of a .csv output file:

	A	B	C	D	
1	SampleID	SourcePlateBarcode	SourcePlateLabware	SourcePlateWell	Target
2	Sample_ID_1	1	VWR_96_VB_DWP_2200ul_0003	A1	
3	Sample_ID_2	1	VWR_96_VB_DWP_2200ul_0003	B1	
4	Sample_ID_3	1	VWR_96_VB_DWP_2200ul_0003	C1	
5	Sample_ID_4	1	VWR_96_VB_DWP_2200ul_0003	D1	
6	Sample_ID_5	1	VWR_96_VB_DWP_2200ul_0003	E1	
7	Sample_ID_6	1	VWR_96_VB_DWP_2200ul_0003	F1	
8	Sample_ID_7	1	VWR_96_VB_DWP_2200ul_0003	G1	
9	Sample_ID_8	1	VWR_96_VB_DWP_2200ul_0003	H1	
10	Sample_ID_9	1	VWR_96_VB_DWP_2200ul_0003	A2	
11	Sample_ID_10	1	VWR_96_VB_DWP_2200ul_0003	B2	
12	Sample_ID_11	1	VWR_96_VB_DWP_2200ul_0003	C2	
13	Sample_ID_12	1	VWR_96_VB_DWP_2200ul_0003	D2	
14	Sample_ID_13	1	VWR_96_VB_DWP_2200ul_0003	E2	
15	Sample_ID_14	2	VWR_96_VB_DWP_2200ul_0004	A1	
16	Sample_ID_15	2	VWR_96_VB_DWP_2200ul_0004	B1	
17	Sample_ID_16	2	VWR_96_VB_DWP_2200ul_0004	C1	
18	Sample_ID_17	2	VWR_96_VB_DWP_2200ul_0004	D1	
19	Sample_ID_18	2	VWR_96_VB_DWP_2200ul_0004	E1	
20	Sample_ID_19	2	VWR_96_VB_DWP_2200ul_0004	F1	
21	Sample_ID_20	2	VWR_96_VB_DWP_2200ul_0004	G1	
22	Sample_ID_21	2	VWR_96_VB_DWP_2200ul_0004	H1	
23	Sample_ID_22	2	VWR_96_VB_DWP_2200ul_0004	A2	
24	Sample_ID_23	2	VWR_96_VB_DWP_2200ul_0004	B2	
25	Sample_ID_24	2	VWR_96_VB_DWP_2200ul_0004	C2	
26	Sample_ID_25	2	VWR_96_VB_DWP_2200ul_0004	D2	
27	Sample_ID_26	2	VWR_96_VB_DWP_2200ul_0004	E2	
28	LAD				
29	LAD				
30	LAD				
31	LAD				
32	LAD				
33	LAD				
34	PTC				
35	NTC				

Part A (columns A to F).

	A	J	K
1	SampleID	tingStatus	PipettingInforma
2	Sample_ID_1		0,0,0,0
3	Sample_ID_2		0,0,0,0
4	Sample_ID_3		0,0,0,0
5	Sample_ID_4		0,0,0,0
6	Sample_ID_5		0,0,0,0
7	Sample_ID_6		0,0,0,0
8	Sample_ID_7		0,0,0,0
9	Sample_ID_8		0,0,0,0
10	Sample_ID_9		0,0,0,0
11	Sample_ID_10		0,0,0,0
12	Sample_ID_11		0,0,0,0
13	Sample_ID_12		0,0,0,0
14	Sample_ID_13		0,0,0,0
15	Sample_ID_14		0,0,0,0
16	Sample_ID_15		0,0,0,0
17	Sample_ID_16		0,0,0,0
18	Sample_ID_17		0,0,0,0
19	Sample_ID_18		0,0,0,0
20	Sample_ID_19		0,0,0,0
21	Sample_ID_20		0,0,0,0
22	Sample_ID_21		0,0,0,0
23	Sample_ID_22		0,0,0,0
24	Sample_ID_23		0,0,0,0
25	Sample_ID_24		0,0,0,0
26	Sample_ID_25		0,0,0,0
27	Sample_ID_26		0,0,0,0
28	LAD		
29	LAD		
30	LAD		
31	LAD		
32	LAD		
33	LAD		
34	PTC		0,0
35	NTC		0,0

Part B (columns G to K)

Example of a .txt output file (CE input file):

```
3500 Plate Layout File Version 1.0

Plate Name      Application Type        Capillary Length (cm)   Polym
        HID     36      POP4    96

Well    Sample Name     Assay   Results Group   File Name Convention
A01     Sample_ID_1                             Sample
A02     Sample_ID_9                             Sample
A03     Sample_ID_16                            Sample
A04     Sample_ID_24                            Sample
B01     Sample_ID_2                             Sample
B02     Sample_ID_10                            Sample
B03     Sample_ID_17                            Sample
B04     Sample_ID_25                            Sample
C01     Sample_ID_3                             Sample
C02     Sample_ID_11                            Sample
C03     Sample_ID_18                            Sample
C04     Sample_ID_26                            Sample
D01     Sample_ID_4                             Sample
D02     Sample_ID_12                            Sample
D03     Sample_ID_19                            Sample
D04     PTC                             Positive Control
E01     Sample_ID_5                             Sample
E02     Sample_ID_13                            Sample
E03     Sample_ID_20                            Sample
E04     NTC                             Negative Control
F01     Sample_ID_6                             Sample
F02     Sample_ID_14                            Sample
F03     Sample_ID_21                            Sample
G01     Sample_ID_7                             Sample
G02     Sample_ID_15                            Sample
G03     Sample_ID_22                            Sample
H01     Sample_ID_8                             Sample
H02     LAD                             Allelic Ladder
H03     Sample_ID_23                            Sample
H04     LAD                             Allelic Ladder
H06     LAD                             Allelic Ladder
H08     LAD                             Allelic Ladder
H10     LAD                             Allelic Ladder
H12     LAD                             Allelic Ladder
```

Part A

```
3500 P

Plate  er Number of Wells Owner Name      Barcode Number  Comments


Well      Sample Type     User Defined Field 1    User Defined Field 2
A01
A02
A03
A04
B01
B02
B03
B04
C01
C02
C03
C04
D01
D02
D03
D04
E01
E02
E03
E04
F01
F02
F03
G01
G02
G03
H01
H02
H03
H04
H06
H08
H10
H12
```

Part B

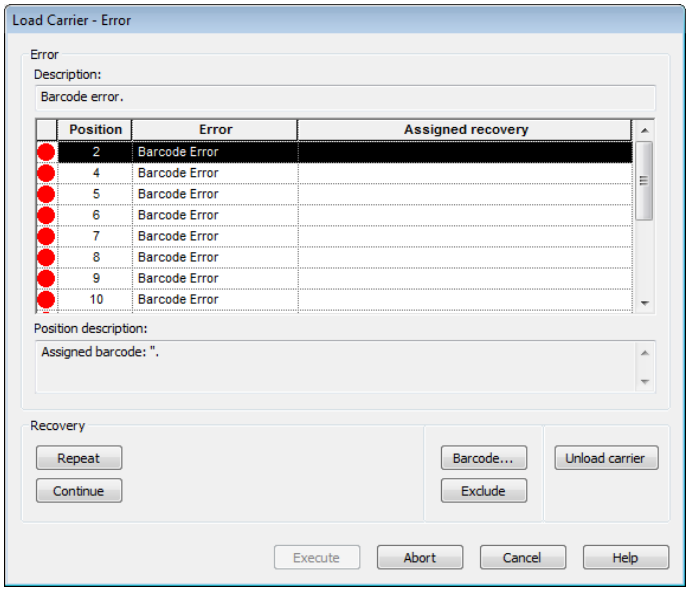
5 Troubleshooting

5.1 Error handling

If an error occurs, the process can be continued using the error handling procedure. A detailed description is available in the STAR Q Swab AS Software **Help** function. Click on **Error Settings** within the single step dialogs of the STAR Q Swab AS line-specific commands and select **Help**.

5.1.1 Barcode reading error

If, for example, a barcode of a carrier cannot be read, the **Load Carrier – Error** dialog opens:



In the **Error** panel, all positions producing an error are listed. The following table describes the columns in the table:

Column	Description
(First column)	A red dot identifies a position with an error
Position	The position number of the barcoded item
Error	Short description of the error
Assigned recovery	Selected action

Different errors can lead to the same short error description. A detailed error description is shown for the selected position in the **Description:** field of the **Error** panel.

The following table describes the buttons in the **Recovery** panel and the error recovery program selected:

Button	Error recovery program
Continue	Ignore the error message (here, failure of the barcode reading) Selecting **Continue** is not indicated in the case of a barcode reading error; a manual entry has to be made so that barcode data exist for further processing.
Repeat	Try again to read the barcode Often a repetition of the reading will solve the problem because the reading speed is reduced.
Barcode…	Enter the barcode manually Click **Barcode…** to open a dialog box where a barcode can be entered (no entry is also allowed).

1. Assign a recovery option to the selected positions.

   The selected action is displayed in the **Assigned recovery** column and the **Execute** button becomes active.

2. Click **Execute**.

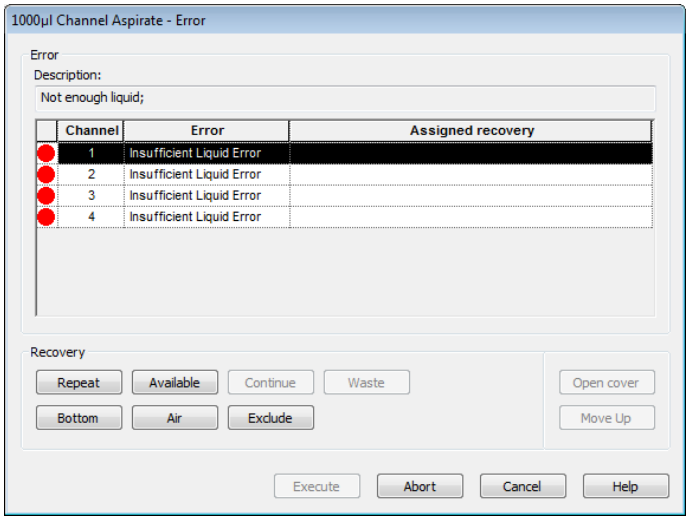
   The instrument proceeds with the selected recovery option.

   Click **Abort** to exit the error recovery procedure without further recovery options.

5.1.2 Pipetting error

If an error occurs with the pipetting channels, a dialog opens to show the error state and recovery options for every channel. Different channels can have different errors.

In case of an LLD error, such as no liquid in the container while aspirating, a dialog similar to the following example opens:



In the **Error** panel, all pipetting channels which produced an error are listed in a table. The following table describes the columns in the table:

Column	Description
(First column)	A red dot identifies a channel with an error
Channel	The number of the channel in the pipetting head
Error	Short description of the error
Assigned recovery	Selected action

Different errors can lead to the same short error description. A detailed error description is shown for the selected channel in the **Description:** field of the **Error** panel.

The following table describes the buttons in the **Recovery** panel and the error recovery program selected:

Button	Error recovery program
Repeat	Executes again the command that caused the error
Available	Aspirates the available volume from the source and fills up the missing volume with air
Continue	Continues as if no error was recognized
Waste	The tip with the error is ejected to the waste and the channel is excluded
Bottom	Activates the channel to move to the bottom of the container; the available volume is aspirated without LLD
Air	Air is pipetted instead of liquid and the method will continue
Exclude	Disables any further action on the selected channel
Move Up	Not an error recovery procedure, but useful e.g., to manually remove a clot. This causes the following actions (this action can be repeated): ● Moves the barcode reader of the Autoload (if present) to the far right ● Moves the selected channel up by 10 mm
Open cover/ Close cover	Not an error recovery procedure; triggers the following actions: ● **Open Cover**: enables opening the front cover during error recovery ● **Close Cover**: enables closing the front cover before executing error recovery

1. Assign a recovery option to the selected channels.

   The selected action is displayed in the **Assigned recovery** column and the **Execute** button becomes active.

2. Click **Execute**.

   The instrument proceeds with the selected recovery option.

   Click **Abort** to exit the error recovery procedure without further recovery options.

An error recovery option must be assigned for every error. Selecting a channel followed by any possible recovery procedure assigns the selected recovery procedure to all error-affected channels with the same error.

If any recovery procedure is assigned to a channel (even one which is not desired to be assigned), the red dot in the first column (see picture above) changes color to green.

Some recovery buttons are disabled to prevent further faulty steps. For example, **Continue** cannot be selected for an error-affected aspiration step to prevent any later dispense action with insufficient volume. When a recovery procedure is assigned to the last faulty channel, the **Execute** button becomes active and the system can proceed.

Note: For all other instrument error messages, please contact QIAGEN Technical Services.

5.2 Log files

In the event of an error, please contact QIAGEN Technical Services.

QIAGEN Technical Services may need your assistance with troubleshooting. The STAR Q Swab AS instrument logs all hardware and software events. These log or trace files might be required for appropriate action to be taken. In addition, screenshots of the error message and/or photos of the problem on the instrument will assist QIAGEN to support you.

Trace files are located in the following system path:

C:\Program Files(x86)\HAMILTON\LogFiles

Two trace files are required for troubleshooting:

- System trace file

  [NameMethod]_[24 characters]_Trace.trc

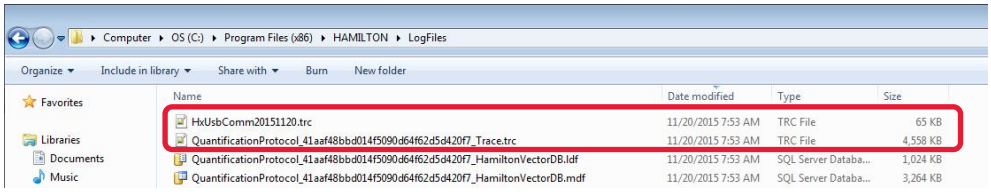
  This trace file is generated every time a method (run) is started. Send the system trace file of the erroneous run to QIAGEN Technical Services to assist with troubleshooting.

- Communication trace file

  HxUsbCommYYYYMMDD.trc
  (If a simulation run was performed, the file name is ComTrace_SimulatorYYYYMMDD.trc)

  A communication trace file is generated every day. There is only one communication file per day. This file is also required for troubleshooting.

An example showing the communication trace file and a system trace file:



6 Maintenance

WARNING/ CAUTION

Risk of personal injury and material damage
Only perform maintenance that is specifically described in this user manual.

WARNING/ CAUTION

Risk of electric shock
Do not open any panels on the STAR Q Swab AS instrument.
Only perform maintenance that is specifically described in this user manual.

The STAR Q Swab AS instrument must be maintained on a regular basis. Regular maintenance consists primarily of surface cleaning and requires opening up the front cover of the instrument. Unscrewing of parts, removal of the deck, side covers or other fixed parts voids the warranty.

The operator is responsible for changing consumable parts including disposable tips and waste bags. QIAGEN Technical Services or service technicians of an authorized agent change spare parts (PCBs, cables, channels, etc.).

Periodic maintenance routines are run to ensure safe and reliable operation of the STAR Q Swab AS instrument and its accessories. A QIAGEN Field Service Specialist or service technician of an authorized agent performs servicing and preventive maintenance on the instrument at least twice a year.

In addition, QIAGEN Technical Services may be called to repair a damaged component of the instrument or to resolve a functional problem which the user cannot resolve such as adjusting and calibrating the channels.

If an error is encountered during a maintenance procedure, attempt to rectify the problem and restart the maintenance procedure. If this fails, contact QIAGEN Technical Services for assistance.

6.1 Maintenance intervals

We recommend the following maintenance intervals:

- Daily before the instrument is shut down
- Weekly at the end of the week before the instrument is shut down
- Six-monthly preventive service maintenance carried out by a QIAGEN Field Service Specialist or service technician of an authorized agent

The STAR Q Swab S instrument is preconfigured to generate warning messages to perform daily and weekly maintenance procedures.

Note: If the operator does not run either daily or weekly maintenance before shutting down the instrument, these routines must be implemented when the next run is started.

Note: If any parts of the instrument, carriers or racks have become contaminated, the weekly maintenance procedure must be performed (see "Weekly maintenance," page 66).

6.1.1 Preventative maintenance

Preventive maintenance including verification should be carried out at regular intervals by QIAGEN Technical Services or service technicians of an authorized agent. A service agreement ensures regular maintenance and verification for a specified period of time. We recommend that maintenance and verification take place twice a year (see "Appendix E — Verification," page 93).

6.2 Materials required for maintenance procedures

CAUTION

Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q Swab AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

When working with chemicals, always wear a suitable lab coat, disposable gloves and protective goggles. Use cleaning, disinfecting and decontaminating fluids in accordance with manufacturer's instructions.

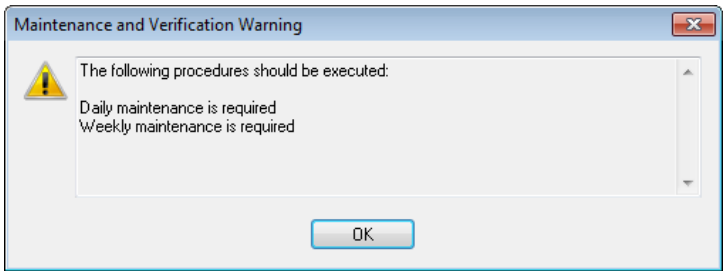
The following materials are required for maintenance procedures:

- Paper towels
- Lint-free cloths or Q-tips
- Set of 8 maintenance needles
- Ethanol (70%)
- Deionized water

6.3 Maintenance procedures

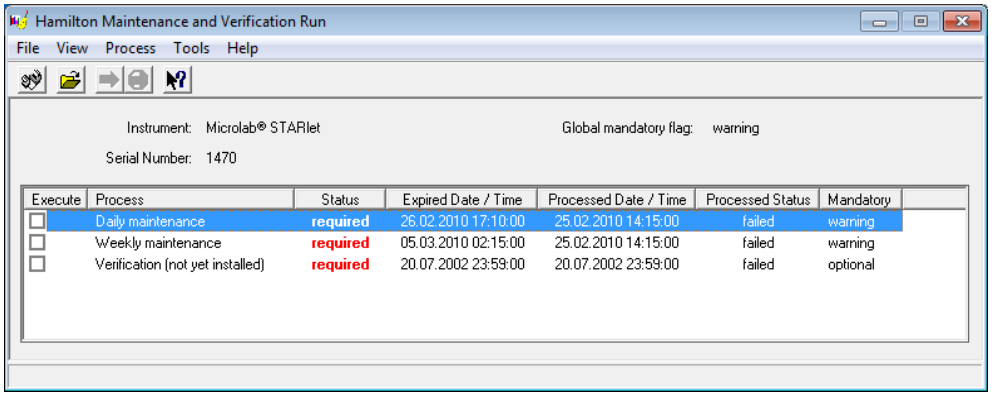
The STAR Q Swab AS Software guides the operator through the regularly scheduled maintenance procedures. The instrument will display a message at start up for optional, warning or mandatory maintenance.

Example of a maintenance warning message:



1. To initiate maintenance procedures, double-click the **Maintenance** icon on the desktop.

   The **Maintenance and Verification Run** window opens. Information is listed on the process and status of all maintenance and verification procedures for the connected/selected instrument.



2. Select the desired maintenance routine by checking the box in the **Execute** column.

3. Press the **Run Process** button.

   The STAR Q Swab AS Software displays instructions detailing all procedures required to perform the selected maintenance routine.

A maintenance routine is completed when the procedure has been fully implemented and the results are within the specifications.

Aborting a maintenance procedure will lead to a failed status, and maintenance will need to be started again.

6.3.1 Daily maintenance

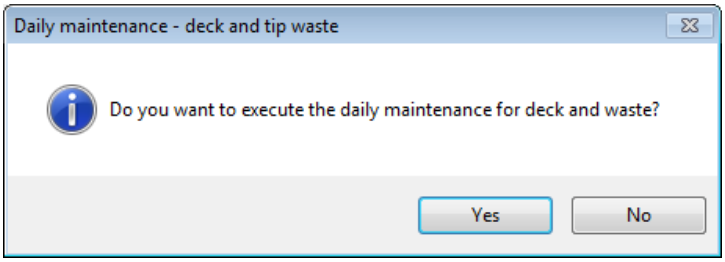
CAUTION

Disposal of plasticware
Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

The following tasks are performed during daily maintenance:

- Check if the deck is clean
- Empty the tip waste
- Check the tightness of the eight 1000 µl channels
- Verifying the functioning of the cLLD (1000 µl pipetting channel)

After initialization of the instrument, the operator is reminded to execute daily maintenance:



1. Click **Yes** to start the daily maintenance procedure. Click **No** to cancel the procedure.

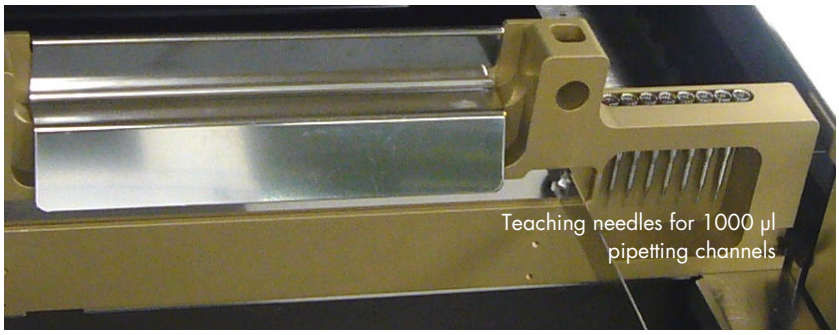
   The hinged acrylic glass window that shields the front of the instrument can be opened for user intervention. The pipetting arm moves to the left side giving the operator access to the deck to check if cleaning is needed.

2. If the deck is clean continue with the daily maintenance.

   If the deck needs to be cleaned, interrupt the daily maintenance to carry out weekly maintenance (see "Weekly maintenance," page 66).

3. Empty the tip waste. Dispose of it with the laboratory's contaminated waste.

4. Continue the procedure with the tightness check of the pipetting channels.

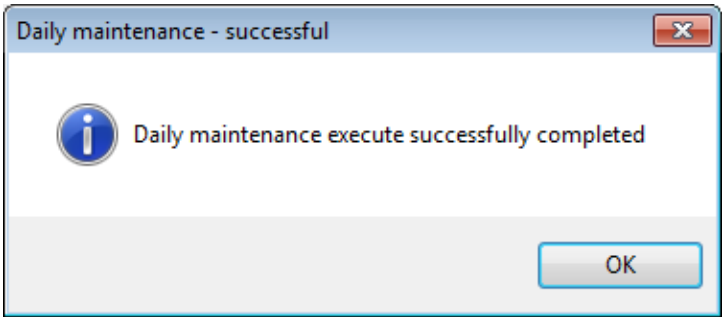


   The pipetting arm travels to the right-hand side to pick up the teaching needles. Two checks are done with the pipetting channels, the over-pressure and the under-pressure check.

5. Check that the needles are picked-up again for cLLD.

   All channels are checked for the proper functioning of the cLLD.

   The following message is displayed at completion of daily maintenance:



   The daily maintenance process status is saved on the instrument and a report file is created. Refer to "Printing a maintenance report," page 69.

6.3.2 Weekly maintenance

CAUTION

Disposal of plasticware
Used plasticware may contain hazardous chemicals, or contagious/biohazardous materials. Such wastes must be collected and disposed of properly according to local safety regulations.

WARNING

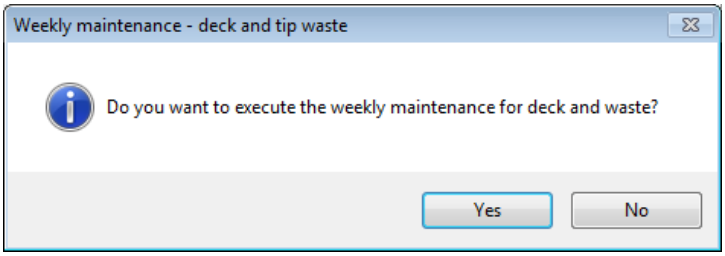
Electrical hazard
When the instrument is connected to line power, terminals may be live. Opening covers or removing parts is likely to expose live parts.
Avoid spilling liquid onto or into the instrument. In case of spilling liquid over the instrument, immediately disconnect the instrument from the mains power.

Note: If any parts of the instrument, carriers or racks have become contaminated, the weekly maintenance procedure must be performed.

The following tasks are performed during weekly maintenance:

- Clean the deck and carriers
- Check the condition of the carriers
- Empty and clean the tip waste
- Check the tightness of the eight 1000 µl channels
- Verify the function of the cLLD of the eight 1000 µl 8channels
- Clean the eight 1000 µl channels: stop disk, O-ring and tip eject sleeve
- Clean the covers and Autoload protecting ribbon

After initialization of the instrument, the operator is reminded to execute weekly maintenance:



1. Unload the deck. The Autoload function carries out this step automatically.

2. Remove all carriers and clean them with disinfectant spray. Leave them to dry.

   If carriers are heavily soiled, soak them in a solution of cleaning liquid (refer to the product data sheet for further information).

3. Examine each carrier for scratches on the barcode and any signs of damage. If damage is apparent, replace with new carriers.

   The Autoload moves to the right-hand side of the instrument.

4. Open the front cover and wipe the deck with a cloth saturated in disinfectant. The slide blocks in particular must be checked for cleanliness.

5. Close the front cover.

   The Autoload moves to the left-hand side of the instrument.

   Note: The tip waste, the tip eject plate and the plastic bag are always to be regarded as contaminated.

6. Remove the tip eject plate of the tip waste station, spray disinfectant directly onto the surface and wipe.

7. Remove the frame that holds the plastic bag in place, and discard the plastic in the laboratory's contaminated waste. Pull a new plastic bag over the frame and re-attach it.

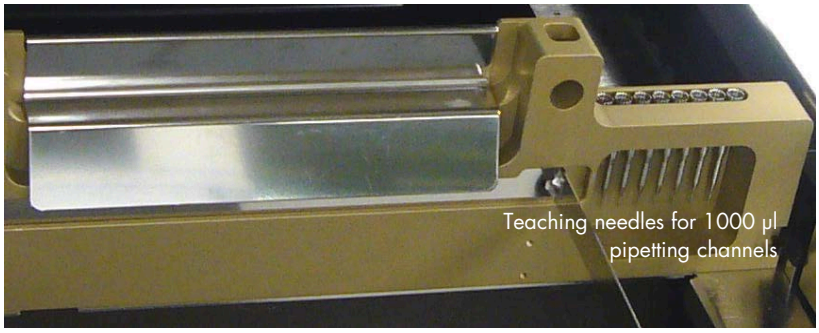
8. Put the clean tip eject plate back in place.

9. Remove the maintenance needle and spray disinfectant directly onto the surface and wipe. Replace the clean and dry maintenance needle.

10. Make sure that the reading of barcodes is reliable by checking the laser scanner window of the barcode reader and cleaning it with a lint-free cloth or Q-tips lightly soaked in ethanol (70%).

    Note: The laser scanner window must be completely dry and free from dust and fibers before the instrument can be reused.

11. Continue the procedure with the tightness check of the pipetting channels.



The pipetting arm travels to the right-hand side to pick up the teaching needles. Two checks are done with the pipetting channels, the over-pressure and the under-pressure check.

12. Check that the needles are picked-up again for cLLD.

    All channels are checked for the proper functioning of the cLLD.

13. Clean the tip eject sleeve on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.

Note: Take care that no liquid gets inside the tip channel.
Whenever it is necessary to move channels on the x-arm, move them gently by pushing close to their Y-slide. Never force them as this may lead to damage. If possible, switch on the instrument as this will result in a smoother motion when channels have to be moved on the x-arm.

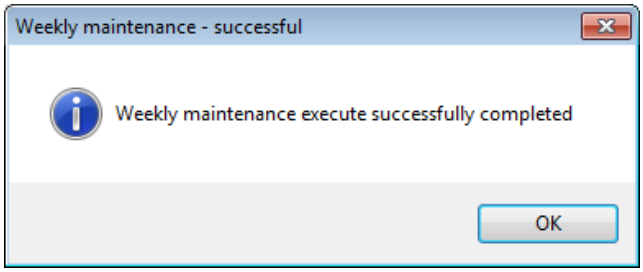
14. Clean the stop disk and the O-rings of the pipetting head on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.

Note: Take care that no liquid gets inside the tip channel.
Whenever it is necessary to move channels on the x-arm, move them gently by pushing close to their Y-slide. Never force them as this may lead to damage. If possible, switch on the instrument as this will result in a smoother motion when channels have to be moved on the x-arm.

15. Spray the front and side cover with disinfectant and wipe dry.

16. Clean the Autoload protecting ribbon with a cloth soaked in disinfectant and wipe without exerting pressure.
17. Clean the x-guide shaft behind the upper front cover with a dry cloth at least once a month.
18. Make sure that carriers are completely clean and dry before re-using.

The following message is displayed at completion of weekly maintenance:



The weekly maintenance process status is saved on the instrument and a report file is created. Refer to "Printing a maintenance report," page 69.

6.4 Printing a maintenance report

The maintenance process status can be printed. To print such a report:

1. From the **File** menu, select **Open Report**.

   All maintenance and verification processes found in the default **Report Path** are listed.
2. If necessary, change the report path using the browse button **<...>**.
3. Select a report and press the **Open** button. The **Report Viewer** displays the selected report file.
4. From the **File** menu, select **Print** to print the report file.

6.5 Maintenance of the heater shaker

WARNING

Risk of personal injury

Do not touch the heater shaker during run time and for 1 hour after finishing a run as it might be hot.

QIAGEN recommends cleaning the HS regularly to prolong its life span. In case of contamination or spillages, clean the HS immediately. The HS must be turned off and cooled down for the maintenance procedure. Follow the cleaning and disinfecting procedures described in this user manual. No further action is required.

6.6 Instrument decontamination

CAUTION

Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q Swab AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

CAUTION

Damage to the instrument

Autoclaving cannot be used for instrument components or accessories (channels, transport tools, heaters, shakers and carriers).

In general, good laboratory practice must be observed for decontamination.

1. Spray the front and side cover of the instrument with disinfectant.
2. Open the front cover and spray the deck with disinfectant.
3. Remove the tip eject plate of the tip waste station and clean it.
4. Spray disinfectant directly onto the surface of the tip waste station.
5. Remove the frame that holds the plastic bag in place and discard the plastic bag in the laboratory's contaminated waste. Replace the tip eject plate.
6. Clean the tip eject sleeve on the outer part of the pipetting channels with a lint-free cloth soaked in disinfectant.
7. Clean all carriers with disinfectant liquid and leave them to dry.
   If the carriers are heavily soiled, soak them in a disinfectant solution (see the product data sheet for further information).

Note: Autoclaving, using superheated steam under pressure, may only be used for decontamination followed by final disposal of consumables and racks; they will be destroyed by the process.

6.6.1 Surface decontamination using liquids

CAUTION

Damage to the instrument

Do not use solvents, or reagents containing acids, alkalis or abrasives to clean the STAR Q Swab AS instrument. Do not use disinfecting materials which contain hypochlorite or other bleaching fluids. Use non-corrosive, neutral liquids.

Use the disinfecting procedure described above for decontamination. Other procedures have not been tested by QIAGEN.

In some cases other decontamination procedures may be desirable, e.g., for reliably destroying infectious materials or DNA/RNA. Many of these decontamination procedures are very aggressive and can cause damage to the STAR Q Swab AS instrument.

If using other decontamination procedures not listed here, be aware that they may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

If using other liquids or sprays for surface decontamination, follow the manufacturer´s instructions. Pay particular attention to potential corrosiveness, e.g., acidic or alkaline solutions and oxidizing agents. Use of such agents may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary. .

When the instrument deck and carriers are cleaned using enzyme solutions such as DNase and RNase, make sure to thoroughly remove any remainders by wiping deck and carriers with deionized water to avoid leaving aggressive substances on the surface.

6.6.2 Decontamination using gases

CAUTION

Damage to the instrument

Ethylene oxide fumigation may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION

Damage to the instrument

Hydrogen peroxide fumigation leads to bleaching or discoloration of many instrument materials and may increase service and maintenance requirements (O-rings exchange, greasing of spindles, etc.) and may make shorter maintenance intervals necessary.

CAUTION

Damage to the instrument

Do not use formaldehyde fumigation or chlorine oxides (chemical compounds of chlorine and oxygen such as bleach). They are not suitable for the STAR Q Swab AS instrument because of chemical reaction and corrosion.

Should decontamination by fumigation be necessary, QIAGEN recommends using ethylene oxide. QIAGEN does not carry out such fumigation procedures; use a 3rd party contractor for such service.

Fumigation using hydrogen peroxide (H_2O_2) is possible but not recommended. QIAGEN does not carry out such fumigation procedures; use a 3rd party contractor for such service.

6.6.3 Decontamination using UV light

CAUTION

Damage to the instrument

UV irradiation causes many synthetic materials to become brittle. This may increase service and maintenance requirements and may make shorter maintenance intervals necessary.

A UV light is mounted on the STAR Q Swab AS instrument. We recommend UV irradiation for 15 minutes per day. The arm will move left and right while the UV lamp is on. Make sure that the path is not blocked. If using other UV irradiation options, use wavelength, intensity and duration according to manufacturer´s instructions.

The instrument cover is made of Makrolon®, not of standard acrylic glass, due to its better resistance to UV irradiation.

7 Glossary

Term	Description
Adjustments	Detailed positional setting for the hardware.
Air displacement pipetting	Air displacement means that the liquid is aspirated into and dispensed from a disposable tip by the movement of a plunger.
Aliquots	Aliquots are identical small volumes of liquid.
Autoload	Hardware assembly that enables automatic loading of the STAR Q Swab AS instrument. It consists of a loading head movable in the Y-direction, which draws the carriers into the instrument and reads the barcodes on the carriers.
Barcode reader	Device for reading sample/plate barcodes; part of the Autoload function.
Carrier	Unit for loading plates, tubes and tips on the STAR Q Swab AS instrument deck. A carrier is handled by the Autoload function.
cLLD	Capacitive liquid level detection.
Container	A container defines a tube, vessel or a single well of a plate.
Deck	The work surface of the STAR Q Swab AS instrument presents the largest possible area. The placing of the carriers on the deck is defined by the tracks (see T/track, below) providing the tracks are in the operating range of the pipetting area.
Deck layout	A collection of labware placed on a deck.
Dispense	To distribute quantities of liquid from a pipetting device.
Deep well plate	Microplate with large well volume, used when higher volumes of sample need to be stored or collected, e.g., chemistry libraries, for cell culture or filtration applications. In general, we assume it is a plate with 96 wells (8 x 12), 9 mm wide in standard SBS format.
Firmware	Lower level program code that is carried out on the processors of the STAR Q Swab AS instrument.
Front cover	Protective covering for the STAR Q Swab AS instrument featuring a hinged front window made of transparent acrylic glass. The work surface of the STAR Q Swab AS instrument is shielded from user intervention and other outside influences such as dust. It also protects the user from the movements of the STAR Q Swab AS instrument.

Term	Description
Good laboratory practices	Also written as GLP, are set of appropriate laboratory behaviors which should be observed.
HS	Heater shaker.
Labware	Movable items placed on the deck, such as carriers, containers or racks.
Liquid	Includes reagents, controls, standards and wash fluids.
LLD (liquid level detection)	Positive detection of liquid achieved either by pressure or capacitive signal detection and transfer.
Loading/unloading	The process by which plate, tube and tip carriers are brought on and off the deck either manually or automatically by the Autoload function.
MAD	Monitored air displacement: aspiration monitoring feature. During the aspiration process, the pressure within the pipetting channel is measured in real time.
Microplate	A plate with 96 wells (8 x 12) 9 mm wide, standard SBS format.
Orbit	The orbit (rotation distance) is defined as peak to peak distance in one direction, e.g., distance between extreme positions in the Y-direction of the plate measured in millimeters (mm).
Pause	Interruption of processing. The current processing steps are completed.
Pipetting	Transfer of liquids, usually a defined volume, from one container to another.
Pipetting arm	Assembly equipped with the pipetting tool and/or plate handler, as well as the common X-drive.
Pipetting channel	Hardware including the function of picking up a tip, aspirating, dispensing, tip eject, liquid level detection and the Y/Z-movements.
Pipetting module	Firmware (lower level program code) which controls a pipetting channel. Included in the category are the Y and Z pipetting movements, and LLD.
pLLD	Pressure-based liquid level detection.
Processing step	Defines what must be carried out on the STAR A Swab AS instrument, as well as the location where it must be carried out and possible interaction with other system components or labware. The action is defined in accordance with the loading and the tasks.
Rack	Grouping of containers, such as deep well plates, microplates, etc.

Term	Description
Rack identification	Barcode for rack identification.
Run	Execution of the processing steps defined in the relevant method with the aim of processing one or more liquids and containers. The run is a series of timed commands to carry out processing on the instrument according to the processing plan. The run can be interrupted to load more elements. Then processing continues according to a newly calculated processing plan; the run starts again. Loading is not a part of the run.
Sample	Refers to a liquid in an unambiguously identified container which is to be processed.
SBS format	Standard format for microplates defined by the Society for Biomolecular Screening.
T/track	The STAR Q Swab AS instrument has equal partitions of 22.5 mm, equivalent to 1-T on the deck. Labware carriers are adapted to those partitions.
TCC	Temperature controlled carrier.
Tip	Disposable tip for pipetting.
Tip rack	Frame that holds the tips.
Tip waste	Container for used and ejected tips.
Trace	Record of the status during processing.
Tube	A container for liquid usually having a circular cross-section and a cylindrical longitudinal section.
User	User of the software. Access rights for different types of users can be defined, such as operators, laboratory managers, etc.
Verification kit	Balance, liquid and disposable tips to verify the function (volume check) of the pipetting heads.
Well	The individual container of a deep well plate or microplate.
Work area	The area on the STAR Q Swab AS instrument accessed during processing. Elements to be pipetted or handled can be placed in this area.

Appendix A — Ordering Information

Product	Contents	Cat. no.
Instrument		
STAR Q Swab AS	Instrument	9002652
Investigator kits*		
Investigator® 24plex GO! Kit (1000)	Primer Mix, Fast Reaction Mix 2.0 including Taq DNA polymerase, Control DNA, allelic ladder 24plex, DNA size standard 550 (BTO)	382428
Investigator IDplex GO! Kit (1000)	Primer mix, Fast Reaction Mix including HotStarTaq® Plus DNA Polymerase, Control DNA, allelic ladder IDplex GO!, DNA size standard 550 (BTO)	381638
Investigator ESSplex SE GO! Kit (1000)	Primer mix, Fast Reaction Mix including HotStarTaq Plus DNA Polymerase, Control DNA, allelic ladder ESSplex SE GO!, DNA size standard 550 (BTO)	381568
Investigator STR GO! Lysis Buffer (200)	Lysis buffer for 200 swab samples	386516
Consumables		
CO-RE Filter-Tips, 50 µl (5760)	50 µl CO-RE Filter Tip, sterile, black, for STAR Q Instruments	990065
CO-RE Filter-Tips, 1000 µl (3850)	1000 µl High volume CO-RE Filter Tip, sterile, black, for STAR Q Instruments	990084
Reagent Container, 120 ml (12)	120 ml Reagent container 1T, self-standing, without lid; use with 8-/12-channel liquid handling arm; 3 wave breakers to avoid splashing during movements	990112
Biohazard Waste Bags (25)	25 biohazard waste bags	990123

* Smaller kit sizes are available; please inquire.

Appendix B — Technical Specifications

STAR Q Swab AS instrument specifications

Dimensions (w x d x h)	Width:112.4 cm (44.25 inches) Depth: 100.6 cm (39.6 inches) Height: 90.3 cm (35.6 inches)
Work area dimensions	Width (x): 67.5 cm (26.6 inches) Depth (y): 49.7 cm (19.6 inches) Height (z): 14.5 cm (5.7 inches) The maximum height for labware used on the deck is 14.0 cm (5.5 inches)
Weight	135 kg (297 lbs.)
Deck capacity	30 tracks (T) allow combinations of: Maximum of 30 tube carriers (1 T) holding 24 or 32 tubes per carrier Maximum of 5 carriers (6 T) holding 5 tip racks or 5 plate positions per carrier
Modal precision	x-y-z positional accuracy of 0.1 mm
Tip size	Low and intermediate volume: 50 µl High volume: 1000 µl
Power consumption	Standby power consumption: 100 VA

Operating data

Maximum power consumption	600 VA or 1000 VA (depending on configuration)
Voltage	100 VAC/115 VAC/230 VAC
Frequency	50/60 Hz ± 3 Hz
Delayed action fuse 600 VA 1000 VA	 115V: 6.3A (T6.3AL250) 230V: 3.15A (T3.15A250) 115V: 10A (T10AL250) 230V: 5A (T5AL250)
Installation category	II
Pollution degree	2
Temperature range	15–35°C
Relative humidity	30 % – 85 % (non-condensing, indoors)
Noise level	<65 dBA (according to EN27779) <46 dBA in standby mode
Altitude	Maximum 2000 m above sea level
Heat: the power consumed will be transferred to head	Example: 600 or 1000 Watts of Heat = 600 or 1000 Joules/second
Recommended computer	Intel Core 2 Duo, ≥ 4 GB RAM, 500 GB Hard Drive, 16x DVD +/-RW, DirectX 250 MB graphic card, MS Windows 7 Professional.
Communication	USB or RS232 with dual processor board Ethernet or USB with LAN dual processor board
Location	Indoor use only

Storage and transportation

Temperature range	–25°C to 60°C
Relative humidity	10–90 % (non-condensing, indoors)

QIAGEN standard computer specifications

Configuration (overview)	**OptiPlex® XE DT: N Series Base Desktop** **Minimum requirements:** Intel® Core™ 2 Duo E8400 (3GHz, 1333 MHz, 6MB) 4096 MB (2x 2048 MB) 1333MHz DDR3 Dual Channel RAM 16x DVD+/-RW 2x 250 GB, RAID1, HDD ● 2x RS232, 6x USB, 2x Ethernet, 1x Digital Video Port Flat Screen 21.5 inches (1920 x 1080) Webcam Mouse and Dell® Soundbar Country specific keyboard Microsoft Windows 7 Ultimate 64 Bit MS Office 2013 for Home and Business Recovery DVD 2 year Dell warranty (next business day support)

Labware for STAR Q Swab AS

Manufacturer	Catalog no.	Description
Bio-Rad	HSP9901	Hard-Shell Low-Profile Thin-Wall 96-well PCR Plate, fully-skirted
ABI	N8016154	Applied Biosystems MicroAmp Optical 96-well Reaction Plate
ABgene	AB1100	Thermo Fisher PCR Plate, 96-Well, Semi-Skirted, Raised Deck
VWR	732-0585	96-well plate, PP, 2.2 ml
Sarstedt®	72.694	2.0 ml skirted tube
Sarstedt	72.730	0.5 ml skirted tube

Pipetting specifications for disposable tips (individual 1000 µl channels)

Disposable tip size	Volume	Trueness |R| (%)	Precision CV (%)
50 µl	0.5 µl	10.0 %	6.0 %
50 µl	1 µl	5.0 %	4.0 %
50 µl	5 µl	2.5 %	1.5 %
50 µl	50 µl	2.0 %	0.75 %
1000 µl	10 µl	7.5 %	3.5 %
1000 µl	100 µl	2.0 %	0.75 %
1000 µl	1000 µl	1.0 %	0.75 %

Operating data for tips

Temperature range	15–25°C

Storage data for tips

Temperature	Maximum 55°C

Liquid level detection

Individual channels	Capacitive Liquid Level Detection (cLLD) and pressure (pLLD) on aspiration, cLLD on dispense, minimum volume 10 µl, depending on container type

CO-RE gripper 1000 µl specifications

Labware format

Microtiter footprint	plate height ≤43 mm

Absolute positioning

Accuracy	x, y, z = 0.5 mm
Reproducibility	x, y, z = 0.25

Movement range

x	Track 1 – n (depending on instrument type)
y	Depending on number of channels and used front channel
z	Lowest position = 15 mm over metal deck sheet

Gripper opening

Arm	Modular pipetting arm
Minimum opening	9 mm
Maximum opening	Dependent upon travel range on arm

Gripping force	5 N – 16 N (default 9 N)

Transport mass	300 g filled deep well plate

Autoload: barcode and reader specifications

Carriers, containers, racks and tip racks can be identified by a barcode. A reader mounted on the Autoload slide scans the barcode. The system must allow specification of ranges (barcode mask) for plausibility checking of barcode information.

Barcode symbologies

The following barcode symbologies can be detected by the system:

- ISBT standard
- Code 128 (subset B and C)
- Code 39
- Codabar
- Code 2 of 5 Interleaved
- UPC A

QIAGEN recommends using barcode type Code128 (subset B and C)

Reading accuracy

The rate of inaccurate readings of sample plates and container barcodes is less than 1 ppm.

The above-mentioned specification is valid under the following conditions:

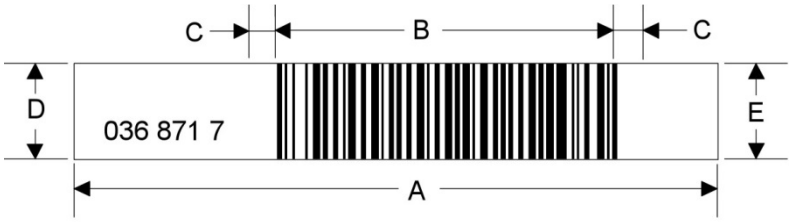
- Barcode symbology module: ISBT standard
- Code density: 0.0065 inch (0.1651 mm)
- Print Quality: see “Barcode specifications,” page 85
- Recognized errors are defined as an accurate reading

Barcode specifications

Type	Modular pipetting arm
Length of string	9 mm
Maximum opening	Dependent upon travel range on arm
Code density	Minimum module width (x dimension) including a print tolerance: ≥ 0.0065 inch (0.1651 mm)
Tolerance	Maximum module width (x dimension) including a print tolerance: ≤ 0.02 inch (0.508 mm) Best reading performance with x dimension: ≥ 0.01 inch (0.254 mm)
Check character: ISBT standard Code 128 Code 39 Codabar Code 2 of 5 interleaved UPC A	 One character One character None None None One character
Quiet zone	≥ 10 times the x dimension, but at least 3 mm
Print quality	The barcode print must be of a high quality. A printed barcode with an ANSI/CEN/ISO grade A or B is required. Offset, typographic, intaglio and flexographic printing are suitable. Mechanical dot matrix and thermo matrix printing are not suitable. The surface may be treated, sealed or plastic-coated.

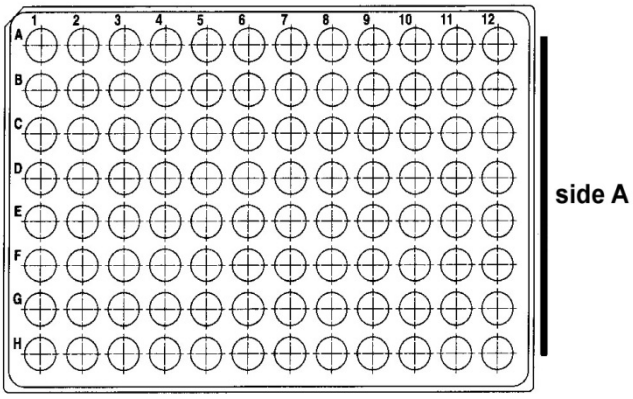
Plate barcodes

Specifications

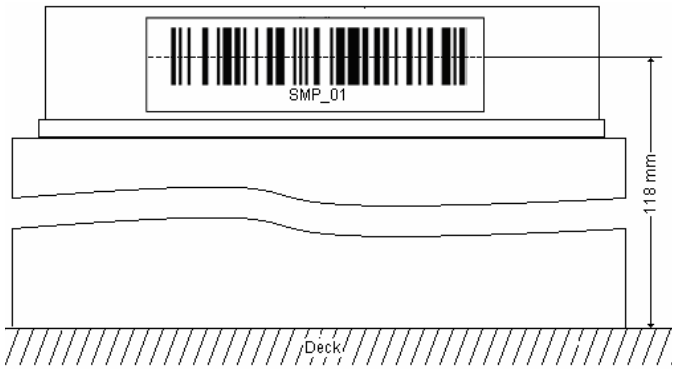


	Dimension	Minimum	Maximum
A	Label length	–	66 mm
B	Code length	–	30 mm
C	Quiet zone	3 mm	–
D	Label width	10 mm	–
E	Code width	7 mm	–
	Distance from code to label edge (if necessary)	–	1 mm

Positioning plate labels



The plate barcode must fit on side A of the plate.



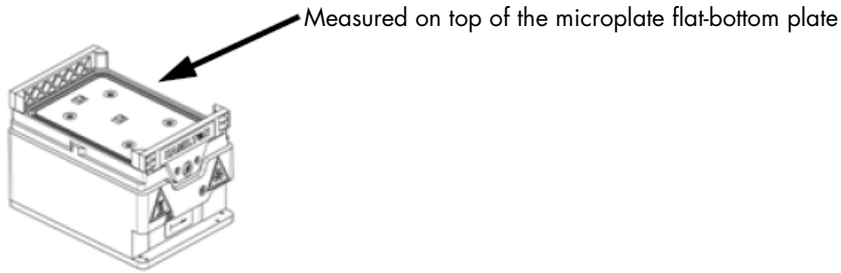
The barcode label must be centered and parallel to the edge of the plate.

The barcode label must not protrude above or below the edge of the plate.

Heater shaker specifications

Dimensions (w x d x h)	15.0 x 10.5 x 9.0 cm (5.9 x 4.1 x 3.5 inches)
Weight	2.5 kg (5.5 lbs)
Labware	Standard microplates with adapter Standard deep well plates with adapter Maximum weight (incl. adapter): 500 g (1 lb)
Communication	CAN via TCC connector or via USB

Temperature specifications



Temperature	Ramp from 25°C	Deviation from target	Tolerance band for measurement and control: Deviation on plate (middle to edge position)
37°C	3 minutes	36.0–38.0°C	35.0–39.0°C
60°C	10 minutes	58.5–61.5°C	57.0–63.0°C
90°C	20 minutes	88.0–92.0°C	86.0–94.0°C
100°C	30 minutes	97.5–102.5°C	95.0–105.0°C
105°C	35 minutes	102.5–107.5°C	100–110°C

Features of the heater shaker

Temperature control	From 5°C above ambient temperature to 105°C Controlled by two sensors located in the middle and at the edge of the adapter plate
Shaking directions	clockwise and counterclockwise
Acceleration	2.0 s from 0 to maximum rpm
Deceleration	2.0 s from maximum rpm to 0
Shaking orbit (peak to peak)	2.0 mm
Shaking speed	100 to 2500 rpm

Shaking speed

Orbit	Microplate	Deep well plate	Sarstedt	Custom
2.0 mm	2500 rpm	2000 rpm	Not available	2000 rpm

Operating data of the heater shaker

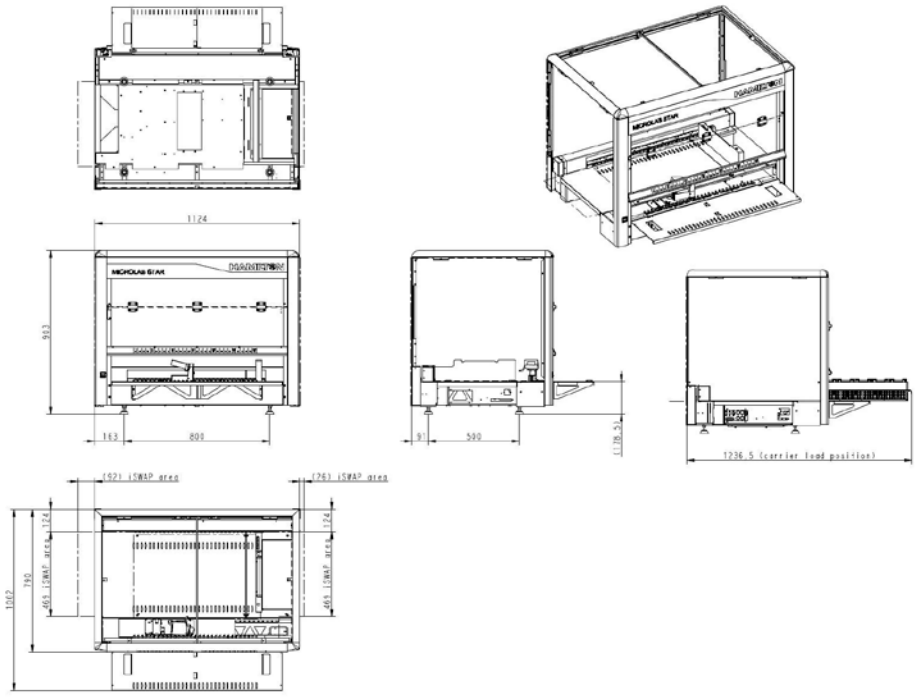
Power consumption	41 V/140 W (max.) supplied by the STAR Q Swab AS instrument
Installation category	II
Pollution degree	2
Temperature range	15–35°C
Relative humidity	15– 85%
Noise level	< 65 dBA at maximum speed
Altitude	Maximum 2000 m above sea level
Lifespan	6 years
Communication	CAN via TCC connector or via USB
Location	Indoor use only

Storage and transportation

Temperature range	–15°C to 60°C
Relative humidity	15– 90% (non-condensing)

Appendix C — Instrument Dimensions

STAR Q Swab AS with Autoload function



Appendix D — Chemical Compatibility

The table for chemical compatibility is based on information from different manufacturers. The results refer to laboratory tests with raw materials. The outcomes with these materials are liable to effects which cannot be observed under laboratory conditions (e.g., temperature, pressure, tension, chemical influences of substances, design features, etc.). The results listed should be considered only as a guideline. In case of doubt we recommend significant tests. The chemical resistance is not sufficient for an evaluation of a particular material for a product. Particular regulations, e.g., explosion prevention in the case of flammable liquids, have to be taken into account.

Key:

1.4034	X46Cr13 steel	FFKM	Kalrez®
1.4301	X2CrNi19-11 steel	FKM	Viton®
1.4305	X8CrNiS18-9 steel	PE	Polyethylene
1.4404	X2CrNiMo17-12-2 steel	PEEK	Polyetheretherketone
1.4435	X2CrNiMo18-14-3 steel	PP	Polypropylene
EPDM	Ethylene-propylene elastomer	PTFE	Polytetrafluorethylene
EPT	Ethylene-propylene terpolymer	ZrO_2	Zirconium oxide

CO-RE head consists of 1.4305, EPDM, PEEK, ZrO_2 and PTFE

1 = No effect, little or no noticeable change

2 = Slight corrosion or discoloration

3 = Moderate corrosion or other change in physical properties or dimensions; not recommended for continuous contact

4 = Severe corrosion or physical change; prolonged contact not recommended

0 = No data

L = Danger of pitting corrosion (a localized form of corrosion that leads to the creation of small holes in the metal)

Chemical compatibility of materials and level of resistance to corrosion

	Material													
Chemical	1.4034	1.4301	1.4305	1.4404	1.4435	PE	PP	PTFE	PEEK	FKM	FFKM	EPT	ZrO_2	CO-RE head
Acetic acid, 20%	2	1	1	1	1	1	1	1	1	2	1	1	0	1
Acetic acid, glacial	2	1	1	1	1	1	1	1	1	4	1	1	0	1
Acetone	1	1	1	1	1	2	1	1	1	4	1	1	0	1
Acetonitrile	1	1	1	1	1	1	3	1	0	2	0	3	0	3
Ammonium hydroxide, 5%	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Chloroform	1	1	1	1	1	3	3	1	1	1	1	4	0	4
Deionized water	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Dimethyl formamide	1	1	1	1	1	1	1	1	1	3	1	1	0	1
Dimethyl sulfoxide	1	1	1	1	1	1	1	1	0	0	0	1	0	1
Ethanol	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Ethyl acetate	1	1	1	1	1	2	1	1	1	4	1	1	0	1
Hexane	1	1	1	1	1	3	2	1	1	1	1	4	0	4
Hydrochloric acid, 5%	4L	2L	3L	2L	2L	1	1	1	1	1	1	1	1	1
Hydrochloric acid, 20%	4L	3L	3L	2L	2L	1	1	1	1	1	1	1	1	1
Hydrogen peroxide, 10%	1	1	1	1	1	2	2	1	1	2	2	2	1	2
Isopropyl alcohol	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Methanol	1	1	1	1	1	1	1	1	1	2	1	1	0	1
Methylene chloride	1	1	1	1	1	4	3	1	2	2	1	4	0	4
Nitric acid, 5–10%	1	1	1	1	1	1	1	1	1	1	1	3	1	3
Nitric acid, 70%	1	1	1	1	1	3	4	1	1	2	1	3	1	3
Phosphate buffer	1	1	1	1	1	1	1	1	0	1	1	1	0	1
Phosphoric acid, 85%	3	2	3	2	2	1	1	1	0	1	1	1	1	3
Potassium hydroxide conc.	3	1	2	1	1	1	1	1	1	3	1	1	1	2
Sodium acetate	1	1	1	1	1	1	1	1	0	4	1	1	0	1
Sodium borate	1	1	1	1	1	1	1	1	0	1	1	1	0	1
Sulfuric acid, 1–75%	4	2	3	2	2	1	1	1	2	1	1	1	1	3
Urine	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Triethylamine	1	1	1	1	1	0	4	1	0	4	0	4	0	4
Toluene	1	1	1	1	1	3	3	1	1	1	1	4	0	4
Sodium hydroxide 5%	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Formic acid 5%	3	1	2	1	1	1	1	1	1	2	1	1	0	2
Sodium hypochlorite 10%	3L	2L	2L	1L	1L	1	1	1	0	1	1	1	0	1

Appendix E — Verification

To perform the verification of the STAR Q Swab AS instrument, Field Verification 2 is used. Field Verification 2 can only be performed by trained personnel.

Verification specifications are different from the specifications given in the technical specifications of this user manual.

The volume verification specifications are different from the pipetting specifications for disposable tips given in the technical specifications of this user manual. The field verification contains validated procedures and equipment defined by QIAGEN to demonstrate and to verify the correct function of the instrument according to specifications given by QIAGEN suitable for the field. The field verification is therefore a reference defined by QIAGEN to compare the instrument´s performance according to given procedures valid for a broad operating range.

Based on that, specifications as applicable in the technical specifications will be achieved by maintaining defined environmental conditions in the laboratory, by keeping the operating range as small as possible, by optimizing the methods such as adapting the liquid classes, knowing the sample liquids and the characteristics of used labware, etc. See also "Appendix B — Technical Specifications," page 78.

For the eight 1000 µl channels, a dye-pipetting procedure followed by gravimetric and photometric analysis is used to verify the trueness and precision.

Devices and accessories such as the heater shaker, barcode reader and cover safety can also be verified with Field Verification 2.

Note: This is an additional feature of the STAR Q Swab AS instrument not included in the STAR Q Swab AS Software.

Appendix F — Waste Electrical and Electronic Equipment (WEEE)

This section provides information about disposal of waste electrical and electronic equipment by users.

The crossed-out wheeled bin symbol (see below) indicates that this product must not be disposed of with other waste; it must be taken to an approved treatment facility or to a designated collection point for recycling, according to local laws and regulations.

The separate collection and recycling of waste electronic equipment at the time of disposal helps to conserve natural resources and ensures that the product is recycled in a manner that protects human health and the environment.

Recycling can be provided by QIAGEN upon request at additional cost. In the European Union, in accordance with the specific WEEE recycling requirements and where a replacement product is being supplied by QIAGEN, free recycling of its WEEE-marked electronic equipment is provided.

To recycle electronic equipment, contact your local QIAGEN sales office for the required return form. Once the form is submitted, you will be contacted by QIAGEN either to request follow-up information for scheduling collection of the electronic waste or to provide you with an individual quote.

Appendix G — Warranty Statement

Thank you for your purchase of QIAGEN instrumentation. Your instrument has been carefully tested to ensure optimum operating efficiency and reproducibility of results. QIAGEN warrants that all new instrumentation manufactured by QIAGEN will correspond to the product specifications and be free from defects in workmanship and materials for a period of twelve (12) months from the original date of shipment. Repair or replacement of defective parts will be provided to the purchaser during this time period provided the QIAGEN instrumentation is operated under conditions of normal and proper use, but not for damage caused by the customer. If any part or subassembly proves to be defective, it will be repaired or replaced at QIAGEN's sole option, subsequent to inspection at the factory, or in the field by an authorized factory representative, provided that such defect manifested under normal and proper use.

Limitation of warranties and remedies

THE FOREGOING WARRANTY IS QIAGEN'S SOLE AND EXCLUSIVE WARRANTY, AND REPAIR OR REPLACEMENT OF DEFECTIVE PARTS IS THE SOLE AND EXCLUSIVE REMEDY. THERE ARE NO OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED. THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED, TO THE FULLEST EXTENT PERMITTED BY LAW. (NOTE: SOME STATES DO NOT PERMIT DISCLAIMERS OF IMPLIED WARRANTIES SO THIS LIMITATION MAY NOT APPLY TO YOU). WITH THE EXCEPTION OF THE ABOVE-REFERENCED REPAIR OR REPLACEMENT REMEDY, QIAGEN SHALL HAVE NO OBLIGATION OR LIABILITY OF ANY NATURE WHATSOEVER WITH RESPECT TO THE QIAGEN INSTRUMENTATION, WHETHER ARISING IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE, INCLUDING BUT NOT LIMITED TO, LIABILITY FOR INDIRECT, CONSEQUENTIAL, INCIDENTAL AND/OR SPECIAL, PUNITIVE, MULTIPLE AND/OR EXEMPLARY DAMAGES AND/OR OTHER LOSSES (INCLUDING LOSS OF USE, LOST REVENUES, LOST PROFITS AND DAMAGE TO REPUTATION), EVEN IF SUCH DAMAGES WERE FORESEEN OR FORSEEABLE, OR WERE BROUGHT TO QIAGEN'S ATTENTION. IN NO EVENT SHALL QIAGEN'S LIABILITY TO YOU EXCEED THE PURCHASE PRICE OF THE PRODUCT.

Liability clause

QIAGEN shall be released from all obligations under its warranty in the event repairs or modifications are made by persons other than its own personnel, except in cases where the Company has given its written consent to perform such repairs or modifications. All materials replaced under this warranty will be warranted only for the duration of the original warranty

period, and in no case beyond the original expiration date of original warranty unless authorized in writing by an officer of the Company. Read-out devices, interfacing devices and associated software will be warranted only for the period offered by the original manufacturer of these products. Representations and warranties made by any person, including representatives of QIAGEN, which are inconsistent or in conflict with the conditions in this warranty shall not be binding upon the Company unless produced in writing and approved by an officer of QIAGEN.

Appendix H — Declaration of Conformity

Name and address of the legal manufacturer:

Hamilton Bonaduz AG
Via Crusch 8
7402 Bonaduz
Switzerland

An up-to-date Declaration of Conformity can be requested from QIAGEN Technical Support.

Appendix I — FCC Declaration

The United States Federal Communications Commission (FCC) in 47 CFR 15.105 declares that the users of this equipment must be informed of the following facts and circumstances:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

The following text appears on the right inside front corner of the "Output" drawer of the instrument:

> This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

QIAGEN is not responsible for any radio or television interference caused by unauthorized modifications of this instrument or the substitution or attachment of connection cables and equipment other than those specified by QIAGEN. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

Appendix J — Safety Information (French, FR)

Avant d'utiliser le STAR Q Swab AS il est impératif de lire attentivement ce manuel et de porter une attention particulière aux consignes de sécurité. Afin de garantir un fonctionnement de l'appareil en toute sécurité et de maintenir l'appareil en bon état de marche, il est impératif de suivre les instructions et consignes de sécurité fournies dans le présent manuel d'utilisation.

Les types d'informations de sécurité suivants sont fournis tout u long du manuel.

AVERTISSEMENT

Le terme AVERTISSEMENT signale des situations risquant d'entraîner des accidents corporels dont l'utilisateur, ou d'autres personnes, pourraient être victime.
Les détails concernant ces circonstances sont donnés dans un encadré identique à celui-ci.

ATTENTION

Le terme ATTENTION signale des situations risquant d'entraîner des détériorations de l'appareil ou de tout autre matériel.
Les détails concernant ces circonstances sont donnés dans un encadré identique à celui-ci.

Les conseils donnés dans ce manuel ont pour but de venir compléter les exigences de sécurité habituelles en vigueur dans le pays de l'utilisateur, et non de s'y substituer.

Utilisation appropriée

ATTENTION

Perte de données
Ne pas ouvrir le capot avant pendant un cycle. Un cycle interrompu suite à l'ouverture du capot avant ne peut pas être redémarré. Pour ouvrir la fenêtre pendant un cycle, cliquer sur **Pause** (interrompre) à l'écran dédié au cycle, attendre l'arrêt de l'appareil, puis ouvrir la fenêtre.

ATTENTION

Perte de données et détérioration de l'appareil

Utilisez uniquement les consommables définis dans ce manuel avec l'instrument STAR Q Swab AS. L'utilisation d'autres consommables peut affecter les performances de l'instrument.

AVERTISSEMENT/ ATTENTION

Risque d'accident corporel et de détérioration du matériel

L'utilisation inappropriée du STAR Q Swab AS peut entraîner des accidents corporels ou une détérioration de l'appareil.

L'utilisation du STAR Q Swab AS est exclusivement réservée au personnel qualifié ayant été convenablement formé.

La maintenance du STAR Q Swab AS doit uniquement être effectuée par des spécialistes du Service Après-Vente QIAGEN.

ATTENTION

Détérioration de l'appareil

La lumière directe du soleil peut décolorer les pièces de l'appareil et abîmer les éléments en plastique.

Le STAR Q Swab AS ne doit pas être exposé à la lumière directe du soleil et doit être éloigné des sources de chaleur, des sources de vibration et des interférences électriques.

ATTENTION

Détérioration de l'appareil

Éviter de renverser de l'eau ou des produits chimiques sur le STAR Q Swab AS.

La détérioration de l'appareil dû au déversement de liquides annule la garantie.

AVERTISSEMENT/ ATTENTION

Risque d'accident corporel et de détérioration du matériel

Ne pas essayer de déplacer le STAR Q Swab AS pendant qu'il est en marche.

Ne jamais soulever un appareil totalement installé pour le transporter d'un endroit à un autre. Seul un technicien de maintenance agréé est autorisé à réinstaller l'appareil dans son nouvel emplacement.

AVERTISSEMENT/ ATTENTION

Risque d'accident corporel et de détérioration du matériel
Le STAR Q Swab AS pèse environ 150 kg. Il convient de prendre les précautions de sécurité nécessaires lors du transport de l'appareil.

AVERTISSEMENT/ ATTENTION

Atmosphère explosive
Le STAR Q Swab AS n'est pas conçu pour être utilisé dans une atmosphère explosive.

AVERTISSEMENT

Risque d'explosion
Le STAR Q Swab AS a été conçu pour l'utilisation des réactifs et substances fournis par les kits QIAGEN.
L'utilisation de réactifs et de substances autres que celles indiquées peut entrainer un risque d'incendie ou d'explosion.

En cas d'urgence, éteindre le STAR Q Swab AS à l'aide de l'interrupteur d'alimentation situé à l'arrière de l'appareil et débrancher le cordon d'alimentation de la prise de courant.

L'appareil doit être installé dans le laboratoire de manière à permettre au personnel d'accéder aux parties avant et latérales de l'appareil pour pouvoir le manipuler, l'entretenir et ouvrir et fermer les capots de protection. Tenir compte des dimensions de l'appareil (voir "Appendix B — Technical Specifications," page 78) et prévoir un espace suffisant permettant à une personne de se déplacer et de travailler confortablement.

Sécurité électrique

Remarque: Avant l'entretien, débrancher le cordon d'alimentation de la prise de courant.

AVERTISSEMENT

Danger électrique
Toute interruption du conducteur de protection (conducteur de terre/de masse) à l'intérieur ou à l'extérieur de l'appareil ou toute déconnexion de la borne du conducteur de protection est susceptible de rendre l'appareil dangereux. outre interruption intentionnelle est interdite.

Tensions mortelles à l'intérieur de l'appareil
Lorsque l'appareil est relié à l'alimentation, les bornes peuvent être sous tension et l'ouverture de capots de l'appareil ou le retrait de pièces risque d'exposer des éléments sous tension.
Éviter de renverser de l'eau ou des produits chimiques sur le STAR Q Swab AS. En cas de déversement de liquides à l'intérieur de l'appareil, débrancher celui-ci de la prise d'alimentation et contacter les Services techniques de QIAGEN.

Afin que le STAR Q Swab AS fonctionné de manière satisfaisante et en toute sécurité, suivre les conseils suivants:

- Le cordon d'alimentation doit être relié à une prise d'alimentation disposant d'un conducteur de protection (terre/masse).
- Les fiches d'alimentation reliées au secteur doivent être facilement accessibles s'il est nécessaire de débrancher rapidement l'équipement du secteur.
- Utiliser uniquement les fiches et cordons d'alimentation fournis avec le système.
- Si l'appareil présente un danger électrique, empêcher le reste du personnel de s'en servir et contacter les Services Techniques de QIAGEN. L'appareil peut présenter un danger électrique dans les cas suivants:
    - Le cordon d'alimentation présente des signes de détérioration.
    - L'appareil a été stocké pendant une longue période dans des conditions non conformes à celles énoncées dans "Appendix B — Technical Specifications," page 78.
    - L'appareil a subi des chocs sévères durant le transport.
    - Du liquide est entré dans l'appareil.

Sécurité biologique et chimique

Lors de la manipulation de substances biologiques, employer des procédures de laboratoire sûres comme décrit dans des publications telles que Biosafety in Microbiological and Biomedical Laboratories, HHS (**http://www.cdc.gov/biosafety/publications/bmbl5/index.htm**).

AVERTISSEMENT

Substances biologiques

Manipuler les substances biologiques avec la plus grande précaution et conformément aux réglementations de sécurité en vigueur. Portez toujours des lunettes de protection, 2 paires de gants et une blouse de laboratoire.

La personne responsable (par exemple, le directeur du laboratoire) doit prendre les précautions nécessaires afin de garantir que l'environnement de travail est sûr, que les opérateurs de l'appareil sont convenablement formés et ne sont pas exposés à des niveaux dangereux d'agents infectieux comme cela est défini dans les fiches techniques santé-sécurité (SDS) ou dans les documents de l'OSHA,* de l'ACGIH† ou du COSHH‡ applicables.

Pour plus d'informations, visitez le site **www.qiagen.com/safety**.

L'évacuation des vapeurs et la mise au rebut des déchets doivent s'effectuer conformément à toutes les réglementations et lois nationales, régionales et locales relatives à la santé et à la sécurité.

AVERTISSEMENT

Produits chimiques

Toujours porter des lunettes de protection, des gants et une blouse de laboratoire.

La personne responsable (par exemple, le directeur du laboratoire) doit prendre les précautions nécessaires afin de garantir que l'environnement de travail est sûr, que les opérateurs de l'appareil sont convenablement formés et ne sont pas exposés à des niveaux dangereux d'agents infectieux comme cela est défini dans les fiches techniques santé-sécurité (SDS) ou dans les documents de l'OSHA,* de l'ACGIH† ou du COSHH‡ applicables.

Pour plus d'informations, visitez le site **www.qiagen.com/safety**.

L'évacuation des vapeurs et la mise au rebut des déchets doivent s'effectuer conformément à toutes les réglementations et lois nationales, régionales et locales relatives à la santé et à la sécurité.

* OSHA : Occupational Safety and Health Administration (États-Unis d'Amérique) (Administration pour la santé et la sécurité du travail).

† ACGIH : American Conference of Government Industrial Hygienists (États-Unis d'Amérique) (Conférence américaine des hygiénistes industriels gouvernementaux).

‡ COSHH : Control of Substances Hazardous to Health (Royaume-Uni) (Contrôle des substances dangereuses pour la santé).

Dangers mécaniques

AVERTISSEMENT

Pièces mobiles

Pour éviter tout contact avec des pièces en mouvement pendant le fonctionnement du STAR Q Swab AS, l'appareil doit être utilisé avec le couvercle fermé.

Ne pas démonter les panneaux du capot. Ils ne renferment aucune pièce réparable par l'utilisateur. En cas de problème avec le STAR Q Swab AS, contacter immédiatement les Services techniques de QIAGEN.

AVERTISSEMENT

Risque d'accident corporel

Ne pas toucher l'agitateur chauffant sur toute la durée du cycle et pendant 1 heure après la fin d'un cycle, car il peut être brûlant.

AVERTISSEMENT

Risque d'accident corporel

Ne pas toucher le module de chauffage et de refroidissement sur toute la durée du cycle et pendant 1 heure après la fin d'un cycle, car il peut être brûlant.

Traitement des déchets

ATTENTION

Élimination du matériel en plastique

Le matériel en plastique usagé peut contenir des produits chimiques dangereux. Ces déchets doivent être convenablement collectés et mis au rebut conformément aux réglementations de sécurité locales.

Sécurité relative à la maintenance

Procéder à la maintenance comme décrit à la Maintenance procédures. QIAGEN facture les réparations rendues nécessaires suite à une maintenance inappropriée.

AVERTISSEMENT/ ATTENTION

Risque d'accident corporel et de détérioration du matériel

Effectuer uniquement la maintenance spécifiquement décrite dans ce manuel.

AVERTISSEMENT/ ATTENTION

Risque de décharge électrique

Ne pas ouvrir les panneaux du STAR Q Swab AS.

Effectuer uniquement la maintenance spécifiquement décrite dans ce manuel.

ATTENTION

Détérioration de l'appareil

Ne pas utiliser de solvants ni de réactifs contenant des acides, des bases ou des composés abrasifs pour nettoyer le STAR Q Swab AS.

Ne pas utiliser de produits désinfectants contenant de l'hypochlorite et autres produits à base de Javel.

ATTENTION

Détérioration de l'appareil

L'autoclavage ne peut être utilisé pour les composants ou accessoires de l'instrument.

ATTENTION

Détérioration de l'appareil

La fumigation d'oxyde d'éthylène peut accroître les besoins en matière d'entretien et de maintenance (remplacement des joints toriques, graissage des axes, etc.) et nécessiter la réduction des intervalles de maintenance.

ATTENTION

Détérioration de l'appareil

La fumigation de peroxyde d'hydrogène entraîne le blanchiment ou la décoloration de nombreux matériaux de l'instrument et peut accroître les besoins en matière d'entretien et de maintenance (remplacement des joints toriques, graissage des axes, etc.) et nécessiter la réduction des intervalles de maintenance.

ATTENTION

Détérioration de l'appareil

N'utilisez pas de fumigation de formaldéhyde ou d'oxydes de chlore (composés chimiques de chlore et d'oxygène tels que l'eau de Javel). Ils ne sont pas adaptés à l'instrument STAR Q Swab AS car ils provoquent des réactions chimiques et de la corrosion.

ATTENTION

Détérioration de l'appareil

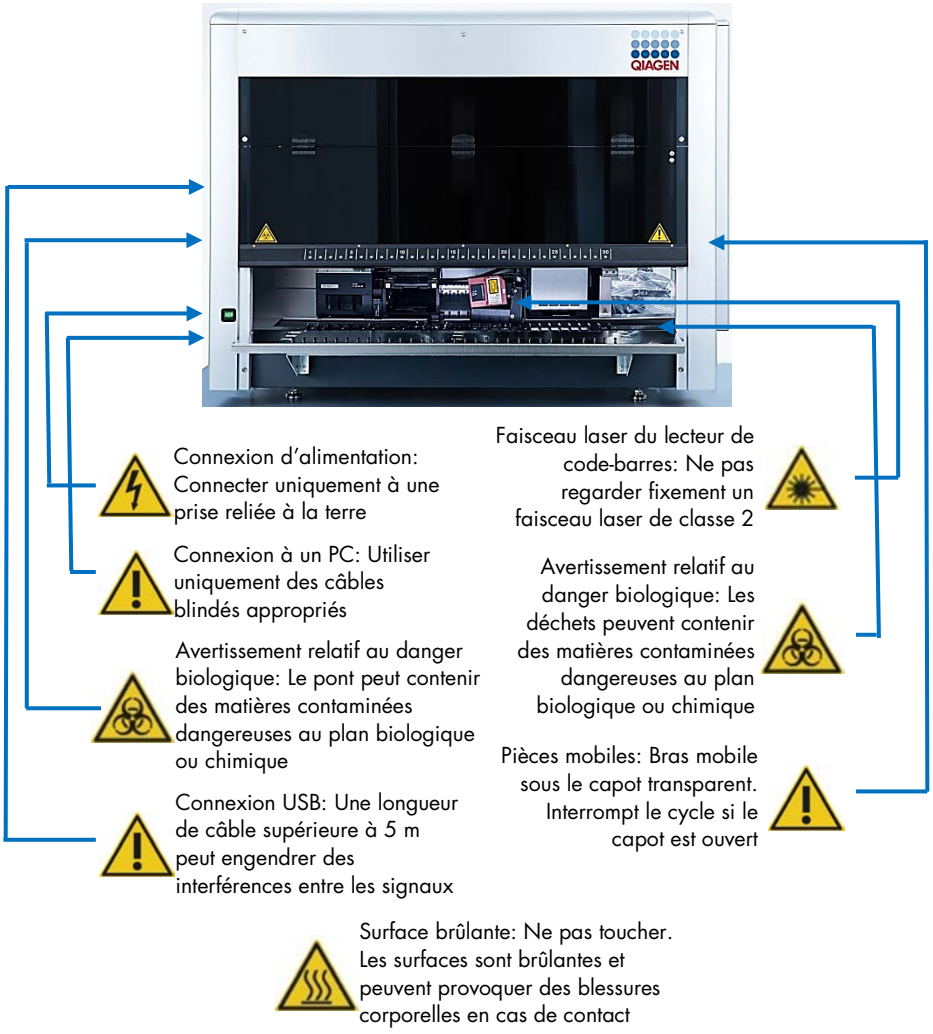
L'exposition aux rayons ultraviolets fragilise de nombreux matériels synthétiques. Cela peut accroître les besoins en matière d'entretien et de maintenance et nécessiter la réduction des intervalles de maintenance.

Symboles sur le STAR Q Swab AS

Symbole	Position	Description
	Plaque signalétique sur l'appareil	Fabricant légal
	Plaque signalétique sur l'appareil	Symbole WEEE
	Plaque signalétique sur l'appareil	Label FCC de la Fédéral Communications Commission des États-Unis
	Plaque signalétique sur l'appareil	Label RoHS pour la Chine (restriction de l'utilisation de certaines substances dangereuses dans l'équipement électrique et électronique)
	Plaque signalétique sur l'appareil	Marque RCM (antérieurement marque C-Tick) pour l'Australie
SN	Plaque signalétique sur l'appareil	Numéro de série

Symbole	Position	Description
GTIN	Plaque signalétique sur l'appareil	Code d'article international
	Sur l'appareil	Signe d'avertissement général
	Sur l'appareil	Avertissement, tension dangereuse
	Sur l'agitateur chauffant	Avertissement, surface brûlante
	Sur le lecteur de code-barres	Avertissement, laser
	Sur l'appareil	Avertissement, danger biologique

Emplacement et explication des étiquettes d'avertissement et de mise en garde:



Appendix K — Safety Information (German, DE)

Lesen Sie dieses Handbuch sorgfältig durch, bevor Sie den STAR Q Swab AS benutzen. Beachten Sie dabei insbesondere die Sicherheitshinweise. Die Gebrauchsanweisungen und Sicherheitshinweise im Handbuch müssen befolgt werden, um einen sicheren Betrieb des Geräts zu gewährleisten und das Gerät in einem sicheren Zustand zu erhalten.

In diesem Handbuch werden die folgenden Kategorien von Sicherheitshinweisen verwendet.

WARNUNG

Der Begriff „WARNUNG“ weist Sie auf Situationen hin, in denen eine Verletzungsgefahr für Sie selbst oder andere Personen besteht.
Nähere Einzelheiten über diese Situationen werden in einem Textfeld wie diesem beschrieben.

ACHTUNG

Der Begriff „ACHTUNG“ weist Sie auf Situationen hin, in denen das Gerät oder andere Geräte beschädigt werden könnten.
Nähere Einzelheiten über diese Situationen werden in einem Textfeld wie diesem beschrieben.

Die in diesem Handbuch enthaltenen Hinweise stellen eine Ergänzung und keinen Ersatz der üblichen Sicherheitsanforderungen dar, die im jeweiligen Land gelten.

Sachgemäße Handhabung

ACHTUNG

Datenverlust
Öffnen Sie niemals die vordere Abdeckung während eines Laufs. Ein abgebrochener Lauf, d. h. einer der durch Öffnen der vorderen Abdeckung angehalten wurde, kann nicht wieder gestartet werden. Zum Öffnen der Abdeckung während eines Laufs klicken Sie auf die Schaltfläche **Pause** in der Betriebsanzeige, warten Sie bis das Gerät anhält und öffnen Sie dann die Abdeckung.

ACHTUNG

Datenverlust und Beschädigung des Geräts
Mit dem STAR Q Swab AS dürfen nur die in diesem Handbuch genannten Laborutensilien verwendet werden. Die Verwendung anderer Laborutensilien kann die Leistung beeinträchtigen.

WARNUNG/ ACHTUNG

Verletzungsgefahr und Beschädigung des Geräts

Die unsachgemäße Bedienung des STAR Q Swab AS kann zu einer Verletzung des Benutzers oder zur Beschädigung des Geräts führen.

Der STAR Q Swab AS darf nur durch qualifiziertes Personal, das entsprechend geschult wurde, bedient werden.

Die Instandhaltung des STAR Q Swab AS darf nur durch einen Außendienst-Mitarbeiter des QIAGEN Service durchgeführt werden.

ACHTUNG

Geräteschäden

Direktes Sonnenlicht kann zum Ausbleichen von Geräteteilen führen und Schäden an Kunststoffteilen verursachen.

STAR Q Swab AS darf nicht in direktem Sonnenlicht oder in unmittelbarer Nähe von Wärme- und Vibrationsquellen oder elektrischen Störfeldern platziert werden.

ACHTUNG

Beschädigung des Geräts

Vermeiden Sie es, Wasser oder Chemikalien auf der Oberfläche des STAR Q Swab AS zu verschütten.

Durch verschüttete Chemikalien oder verschüttetes Wasser verursachte Geräteschäden sind nicht durch die Garantie abgedeckt.

WARNUNG/ ACHTUNG

Verletzungsgefahr und Beschädigung des Geräts

Bewegen Sie STAR Q Swab AS auf keinen Fall während des Betriebs.

Heben Sie niemals ein voll installiertes Gerät zum Transport von einem Ort zu einem anderen. Es muss an dem neuen Ort von einem autorisierten Service Techniker neu installiert werden

WARNUNG/ ACHTUNG

Verletzungsgefahr und Beschädigung des Geräts

STAR Q Swab AS wiegt ungefähr 150 kg. Beim Transport des Geräts sollten nötige Sicherheitsvorkehrungen getroffen werden.

WARNUNG/ ACHTUNG

Explosionsfähige Atmosphären
Der STAR Q Swab AS ist nicht für den Gebrauch in explosionsfähigen Atmosphären vorgesehen.

WARNUNG

Explosionsgefahr
Der STAR Q Swab AS ist ausschließlich mit Reagenzien und Substanzen aus den QIAGEN Kits zu benutzen.
Die Benutzung von anderen Reagenzien oder Substanzen kann Feuer oder eine Explosion auslösen.

Schalten Sie im Notfall den STAR Q Swab AS aus und ziehen Sie den Netzstecker aus der Steckdose.

Das Gerät sollte im Labor so aufgestellt werden, dass Personal die Vorderseite und die Seitenwände des Geräts zum Betrieb, zur Wartung, zum Öffnen und zum Schließen der Schutzabdeckungen erreichen kann. Beachten Sie die Abmessungen des Geräts (siehe "Appendix B — Technical Specifications," Seite 78) und kalkulieren Sie ausreichend Bewegungsraum zum bequemen Arbeiten für eine Person.

Elektrische Sicherheit

Hinweis: Ziehen Sie das Netzanschlusskabel aus der Steckdose, bevor Sie Wartungsarbeiten am Gerät vornehmen..

WARNUNG

Gefahr durch Stromschlag
Jede Unterbrechung des Schutzleiters (Erdungs- bzw. Masseleiter) im Gerät oder außerhalb des Geräts und jede Abtrennung des Schutzleiters am Anschluss der Netzleitung erhöht die Gefahr eines Stromschlags.
Eine absichtliche Unterbrechung der Schutzleiterverbindung ist verboten.
Gefährliche Spannung im Gerät
Wenn das Gerät an die Stromversorgung angeschlossen ist, sind die Anschlussstellen spannungsführend. Durch das Öffnen der Abdeckungen oder das Entfernen von Gehäuseteilen können spannungsführende Komponenten freigelegt werden.
Vermeiden Sie es, Wasser oder Chemikalien auf der Oberfläche des STAR Q Swab AS zu verschütten. Falls Flüssigkeit auf dem Gerät verschüttet wird und in das Gerät läuft, dann schalten Sie es sofort aus, trennen Sie es von der Netzspannung (Stecker ziehen!) und setzen Sie sich mit dem Technischen Service von QIAGEN in Verbindung.

Um einen zufriedenstellenden und sicheren Betrieb des STAR Q Swab AS zu gewährleisten, befolgen Sie bitte die nachstehenden Richtlinien:

- Das Netzkabel muss an eine Steckdose mit Schutzleiter (Erdung/ Masse) angeschlossen werden.
- Sorgen Sie dafür, dass der Netzstecker jederzeit frei zugänglich ist, für den Fall, dass das Gerät schnell vom Stromnetz getrennt werden muss.
- Verwenden Sie nur Netzgeräte und Netzkabel, die mit dem Gerät geliefert werden.
- Falls die elektrische Sicherheit bei der Bedienung des Geräts nicht mehr gewährleistet werden kann, muss das Gerät gegen unbefugte oder unabsichtliche Benutzung gesichert werden. Kontaktieren Sie anschließend den Technischen Service von QIAGEN. Die elektrische Sicherheit des Geräts ist nicht mehr gegeben, wenn:
    - das Netzkabel beschädigt ist;
    - das Gerät längere Zeit unter ungünstigen Bedingungen, d. h. unter anderen Bedingungen als in Anhang STAR Q Swab AS angegeben, gelagert wurde;
    - das Gerät unsachgemäß transportiert worden ist.
    - Flüssigkeit in das Gerät eingedrungen ist.

Biologische und chemische Sicherheit

Wenden Sie beim Umgang mit biologischen Materialien nur sichere Laborverfahren an, wie sie z. B. in Veröffentlichungen wie Biosafety in Microbiological and Biomedical Laboratories, HHS (**http://www.cdc.gov/biosafety/publications/bmbl5/index.htm**).

WARNUNG

Biologische Materialien

Gehen Sie beim Umgang mit biologischen Materialien mit der größtmöglichen Vorsicht und gemäß den erforderlichen Sicherheitsbestimmungen vor. Tragen Sie stets eine Schutzbrille, zwei Paar Laborhandschuhe und einen Laborkittel.

Die verantwortliche Person (z. B. der Laborleiter) muss alle erforderlichen Vorsichtsmaßnahmen treffen, um sicherzustellen, dass die unmittelbare Umgebung des Arbeitsplatzes sicher ist und die Bediener des Geräts ausreichend geschult sind. Außerdem dürfen die Grenzwerte in Bezug auf infektiöse Erreger, die in den entsprechenden Sicherheitsdatenblättern (SDS) oder den Vorschriften der OSHA,* ACGIH† oder COSHH‡ festgelegt sind, nicht überschritten werden.

Weitere Informationen finden Sie im Internet unter **www.qiagen.com/safety**.

Beim Betrieb des Abzugs und bei der Entsorgung von Abfallstoffen müssen alle Bestimmungen und Gesetze zu Gesundheitsschutz und Sicherheit am Arbeitsplatz auf übernationaler, nationaler und regionaler Ebene eingehalten werden.

WARNUNG

Gefährliche Chemikal

Tragen Sie immer eine Schutzbrille, Laborhandschuhe und einen Laborkittel.

Die verantwortliche Person (z. B. der Laborleiter) muss alle erforderlichen Vorsichtsmaßnahmen treffen, um sicherzustellen, dass die unmittelbare Umgebung des Arbeitsplatzes sicher ist und die Bediener des Geräts ausreichend geschult sind. Außerdem dürfen die Grenzwerte in Bezug auf infektiöse Erreger, die in den entsprechenden Sicherheitsdatenblättern (SDS) oder den Vorschriften der OSHA,* ACGIH† oder COSHH‡ festgelegt sind, nicht überschritten werden.

Weitere Informationen finden Sie im Internet unter **www.qiagen.com/safety**.

Beim Betrieb des Abzugs und bei der Entsorgung von Abfallstoffen müssen alle Bestimmungen und Gesetze zu Gesundheitsschutz und Sicherheit am Arbeitsplatz auf übernationaler, nationaler und regionaler Ebene eingehalten werden.

* OSHA: Occupational Safety and Health Administration (Vereinigte Staaten von Amerika).
† ACGIH: American Conference of Government Industrial Hygienists (Vereinigte Staaten von Amerika).
‡ COSHH: Control of Substances Hazardous to Health (Vereinigtes Königreich).

Gefahren durch mechanische Teile

WARNUNG

Sich bewegende Geräteteile

Um einen Kontakt mit sich bewegenden Teilen beim Betrieb des STAR Q Swab AS zu vermeiden, darf das Gerät nur mit geschlossenem Deckel betrieben warden.

Entfernen Sie nicht die Abdeckplatten; im Geräteinneren befinden sich keine Bauteile, die vom Anwender gewartet werden müssen. Setzen Sie sich umgehend mit dem Technischen Service von QIAGEN in Verbindung, wenn einmal ein Problem mit STAR Q Swab AS auftreten sollte.

WARNUNG

Verletzungsgefahr

Berühren Sie den Heizschüttler nicht während des Laufs und für 1 Stunde nach Beenden des Laufs, da das Gerät heiß sein könnte.

WARNUNG

Verletzungsgefahr

Berühren Sie das Heiz- und Kühlmodul nicht während des Laufs und für 1 Stunde nach Beenden des Laufs, da das Gerät heiß sein könnte.

Abfallentsorgung

ACHTUNG

Entsorgung von Kunststoffverbrauchsmaterial

Benutzte Kunststoff-Laborartikel können gefährliche Chemikalien enthalten. Derartige Abfälle müssen gemäß den geltenden regionalen Sicherheitsbestimmungen gesammelt und entsorgt werden.

Sicherheitshinweise – Wartungsarbeiten

Führen Sie alle Wartungsarbeiten gemäß den Anweisungen in Abschnitt “Maintenance” durch. QIAGEN stellt alle Reparaturen in Rechnung, die nachweislich auf eine inkorrekte Wartung zurückzuführen sind.

WARNUNG/ ACHTUNG

Verletzungsgefahr und Beschädigung des Geräts

Führen Sie nur Wartungsarbeiten durch, die ausdrücklich in dieser Gebrauchsanweisung beschrieben sind.

WARNUNG/ ACHTUNG

Gefahr durch Stromschlag

Öffnen Sie keine Gehäuseteile des STAR Q Swab AS.
Führen Sie nur Wartungsarbeiten durch, die ausdrücklich in dieser Gebrauchsanweisung beschrieben sind.

ACHTUNG

Beschädigung des Geräts

Verwenden Sie weder Lösungsmittel noch Reagenzien, die Säuren, Laugen oder Abrasivstoffe enthalten, um das STAR Q Swab AS zu reinigen.
Verwenden Sie keine Desinfektionsmittel, die Hypochlorit oder andere flüssige Bleichmittel enthalten.

ACHTUNG

Beschädigung des Geräts

Gerätekomponenten und Zubehörteile (Pipettierkanäle, Transportwerkzeuge, Heizvorrichtungen, Schüttler und Carrier) dürfen nicht im Autoklaven sterilisiert werden.

ACHTUNG

Beschädigung des Geräts

Eine Desinfektion mit Ethylenoxid kann zu erhöhtem Wartungsaufwand führen (Austausch von O-Ringen, Einfetten von Spindeln usw.) und die Intervalle zwischen den Wartungen verkürzen.

ACHTUNG

Beschädigung des Geräts

Eine Desinfektion mit Wasserstoffperoxid kann zum Ausbleichen oder zu Verfärbungen vieler Gerätematerialien und zu erhöhtem Wartungsaufwand führen (Austausch von O-Ringen, Einfetten von Spindeln usw.) und die Intervalle zwischen den Wartungen verkürzen.

ACHTUNG

Beschädigung des Geräts

Führen Sie keine Desinfektion mit Formaldehyd durch und verwenden Sie keine Chloroxide (chemische Verbindungen zwischen Chlor und Sauerstoff, beispielsweise Bleiche). Diese Chemikalien sind aufgrund ihrer Reaktionsfähigkeit und ätzenden Eigenschaften für den STAR Q Swab AS ungeeignet.

ACHTUNG

Beschädigung des Geräts

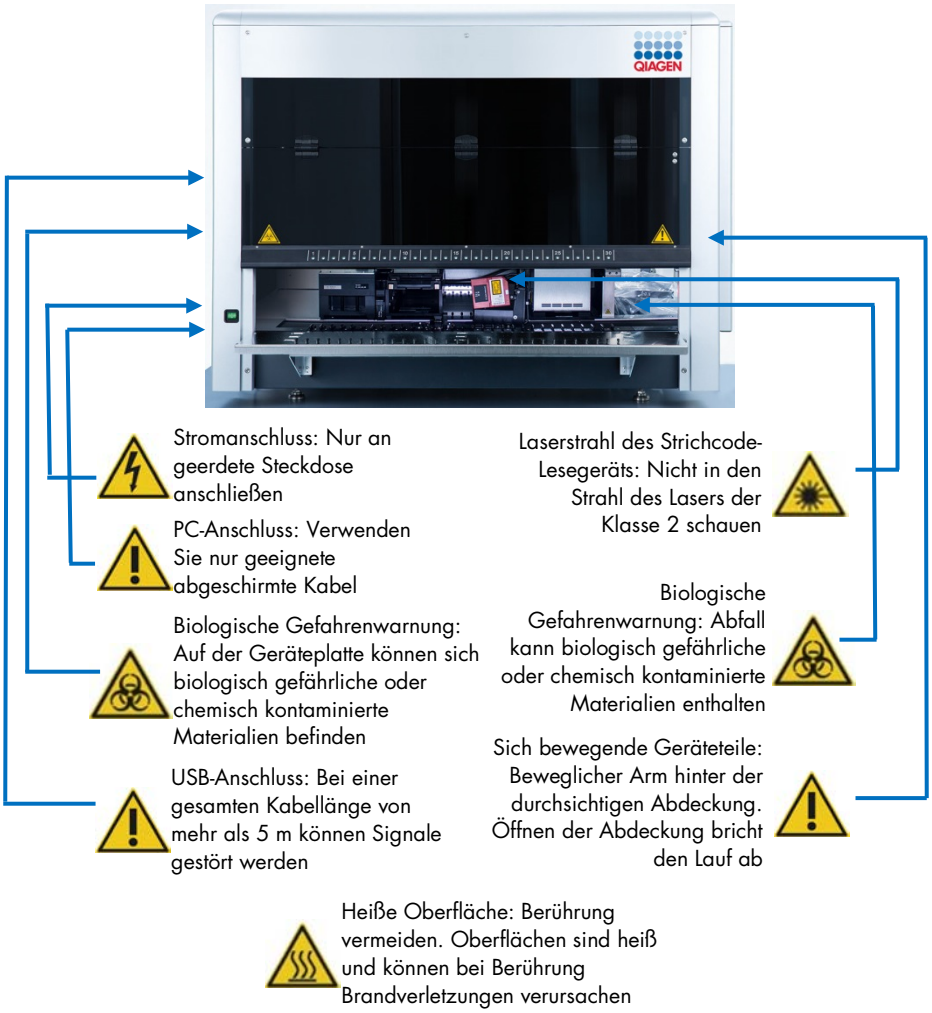
Viele synthetische Materialien werden durch UV-Einstrahlung brüchig. Dies kann zu erhöhtem Wartungsaufwand führen und die Intervalle zwischen den Wartungen verkürzen.

Symbole auf dem STAR Q Swab AS

Symbol	Position	Beschreibung
	Typenschild auf dem Gerät	Hersteller i. S. d. Gesetzes
	Typenschild auf dem Gerät	WEEE-Kennzeichnung (gemäß europäischer Richtlinien bzw. Elektround Elektronik- Altgeräte-Verordnung)
	Typenschild auf dem Gerät	FCC-Kennzeichen der Federal Communications Commission der Vereinigten Staaten
	Typenschild auf dem Gerät	Markierung gemäß RoHSRichtlinie für China (Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten
	Typenschild auf dem Gerät	RCM-Kennung (ehemals C-Tick-Kennzeichen) für Australien
SN	Typenschild auf dem Gerät	Seriennummer

Symbol	Position	Beschreibung
GTIN	Typenschild auf dem Gerät	Internationale Artikelnummer
	Auf dem Gerät	Allgemeines Warnsymbol
	Auf dem Gerät	Warnung, gefährliche Spannung
	Auf dem Heizschüttler	Warnung, heiße Oberfläche
	Auf dem Strichcode-Lesegeräts	Warnung, Laser
	Auf dem Gerät	Warnung, biologische Gefahr

Ort und Erläuterung der Warn- und Hinweisbeschriftungen:



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